BIOLOGY

Test Items for Higher Secondary Schools

PART I

CLASS XI

National Council of Educational Research and Training

BIOLOGY

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CLASS XI

National Council of Educational Research and Training

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FOREWORD

The National Council of Educational Research and Training, after the completion of the preparation of textbooks for all classes under the 10+2 pattern of education, has initiated the production of Test Items and Teacher's Guides corresponding to all the textbooks prepared so far.

The present volume of Test Items is based on "Biology—A Textbook for Higher Secondary Schools, Part I, 1977" published for class XI by the Wiley Eastern Ltd., New Delhi under authorization from the NCERT. It is hoped that the questions in this volume will help the teachers to conduct the diagnostic tests in their classes. It is also expected that on the basis of these questions the teachers will adopt the suitable teaching-learning strategy to optimise the learning outcomes in the students.

The first draft of this book was prepared in a workshop held at the Regional College of Education, Bhopal. The list of participants of this workshop is given elsewhere. The manuscript was finalized by an Editorial Committee consisting of Dr. A.K. Mishra, Dr. D. Lahiry and Dr. J.S. Gill (Convenor) of the Department of Education in Science and Mathematics, NCERT, New Delhi. The efforts of all the participants of the workshop and the members of the Editorial Committee in making this publication possible are gratefully acknowledged.

Comments and criticism of these questions are invited from the teachers of Biology concerned with this course in order to improve the quality of the questions for their use in the next edition.

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December 1978

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CONTENTS

Page
FOREWORD (iii)
LIST OF PARTICIPANTS OF WORKSHOP (v)
INTRODUCTION 1

SECTION I

Anatomy and Physiology—Animals

CHAPTER
1. Microscopic Structure of Mammalian Tissues 6
2. Digestive System 14
3. Respiratory System 22
4. Circulatory System 28
5. Excretory System 33
6. Nervous System 40
7. Muscular System 48
8. Skeletal System 55
9. Endocrine System 61
10. Reproductive System 67
11. Biological Rhythms 73

Anatomy and Physiology—Plants

12. Meristems 77
13. Water Relations of the Plant Cell 81
14. Root—Structure and Functions 86
15. The Inorganic Nutrition of Plants 92
16. The Stem 97
17. Forms and Functions of the Conducting Tissues 104
18. Leaf—Structure and Functions 110
19. Respiration 118
20. Plant Growth and Development 124
21. Plant Movements 130
22. Plant Rhythms 133

SECTION II

Systematics

23. Systematics as a Discipline 136
24. Utility of Systematics 139
25. Principles of Classical and New Systematics 141
26. Binomial Nomenclature 145
27. Familiarity with Taxa 148
28. Systems of Plant and Animal Classification 151
29. Outline Classification of the Plant and Animal kingdoms 156
30. Collection and Identification of Animals and Plants 169

SECTION III

Man and Environment

31. Growth of Human Population 173
32. Factors Controlling Population Distribution and Density 176
33. Soil, Rainfall and Temperature with Reference to Natural Resources 180
34. Our Natural Resources—Their Use and Abuse 184
35. Conservation of Forests and Wild Life 190
36. Environmental Pollution 194
37. Radiation and Chemical Hazards 202

Key and Outline Answers 207

INTRODUCTION

A teacher while dealing with different topics in the classroom adopts different teaching strategies to make the instruction more effective. In order to improve the instruction as well as the outcome in terms of pupil's achievement the teacher should be able to know the extent upto which the class as whole, and also the individual pupils, have imbibed the content dealt by him in the class. The teacher may evaluate the effectiveness of his instructions through various objective based test items. This evaluation may be done by giving periodic tests during the course of a lesson. The teacher can use the test items for day to day evaluation for various topics. He will also find it easier to develop his own evaluation items for his class on the basis of the test items given here. These questions will also give some ideas about the desired depth of the topics to be taught. Some of the questions can be given as home assignment and also for diagnostic and remedial purposes. From the given test items and from those developed by himself, the teacher can prepare the suitable combination in the form of examination papers for promotional purposes.

Framing of questions is not an individual's task and it is not easy to prepare all types of test items as the person may not be equally equipped for all the areas. Accordingly, a workshop was organised by this department at the Regional College of Education, Bhopal. The participants included subject experts from colleges and universities, secondary and higher secondary teachers and experts from state institutes of science education and a team from the NCERT.

This booklet embodies test items based on first edition 1977 of 'Biology—A textbook of higher secondary class XI Part 1, Vol 1 & 2', published by Wiley Eastern Limited with permission from NCERT. The questions are objective based and arranged sequentially unitwise as given in the textbook.

Unit 1 Anatomy and Physiology of Plants.
Unit 2 Anatomy and Physiology of Animals.
Unit 3 Systematics
Unit 4 Man and environment.

The following major types of test items have been framed in this volume.

1. Completion type

In this type of test items the statement lacks one or two key words. The students are required to fill in the blanks with suitable words. Too many blanks in a single statement or question are generally avoided These questions generally test the students ability to recall a particular information.

2. True-false type

In this type a number of statements are given which are either true or false. The students are called upon to write 'T' against true and 'F' against the false statements. While preparing this type of tests, the number of wrong or false statements is generally more than those of true ones. The statements may be separately designed or taken from the text book. These items often go above the level of simple recall and, if properly structured, can test student's understanding, his ability of application, analysis or synthesis.

3. Multiple choice type

The stem of items is followed by number of probable answers marked by letters a, b, c,..... The student is required to tick (√) mark the correct answer. Only one of the four possibilities given constitutes the correct answer. In the event of two or more items being nearly correct the most appropriate one is to be tick marked. This type of items help in testing nearly all the classes of cognition, from knowledge to evaluation, if suitably framed

4. Matching type

It has two columns of words, phrases, figures or statements. The students are asked to match the items of one column with appropriate items in other column. Care is taken to list items which are somewhat related to each other. In order to avoid automatic matching in case of the last item one or more extra statements are given in the second column. This type of items generally test the ability to recall and understanding of the learner.

5. Classification type

In this type of tests four or five words are given out of which one does not fit into the classification or category of rest of the words. Students are required to point out the odd word in the set. These test items are good for testing the understanding of relationships and associations.

6. Analogy type

Here three words are given. The student is asked to supply the fourth word which will have the same relationship with the third word as that exists between the first and second words. Such questions help in testing the reasoning ability of learners.

7. Master-list type

In this case four or five related concepts are given as alternatives called 'Master list' followed by number of statements or questions. The students will tally each of these questions with one of the given alternatives. Each alternative may be used once or more or not at all. These items are useful for covering related content area within a chapter or chapters.

8. Terminology type

The statements or definitions related to scientific terms are given. Students are asked to supply the appropriate term. This test helps in assessing the understanding of various definitions and phenomena. The questions are a varied form of completion type.

9. Structured type

Here a number of questions are given based on a particular situation, statement, experiment or a diagram. Generally the questions of multiple choice type or short answer type are used. These test items also help in assessing essay type questions in the form of short answers as objective type of tests.

Short answer type

These tests are free response type questions. But the answers are restricted by the design of the questions. The answers may be only one word or more upto two or three sentences. Preferably question involving only one concept may be asked.

Essay type

This type of questions require descriptive, often extended answers in a sequential or organised manner which may even require diagrams. The answers may range from a paragraph to several pages. The students are required to describe, comment, integrate or explain scientific concepts or phenomena.

Other types

These include all miscellaneous test items which are not covered by any of the types given above.

The nature and design of test items to be used depends upon the content under assessment. Some of the test items serve specific purposes. For example, *Master List type* helps in testing several related content areas of the same or different chapters. The classification type are useful especially for testing the understanding of relationships. Essay type of descriptive nature can be tested better through structured type of test items.

Arrangement of Test Items

In this volume test items are arranged chapterwise in the same sequence as in the prescribed text book, Biology For Higher Secondary Schools, Part I, Volume 1 and 2, and closely follow the text.

Further, in each chapter the test items are arranged type wise and not in sequence of running content matter. The same concept and content is often tested by various types of the test items as per the objective to be tested. This does not mean repitition. Similar types of test items can be stated in different forms and therefore, there may be considerable overlapping. Even expected responses in particular type of test items may be found in other types. There is no uniform weightage distributed to different types of test items. It is not in conformity to any plan or examination scheme.

Each chapter has four digit numbers for each test item indicating both the chapter number and test item number. For example 0101 test item means.

01 — Chapter I
01 — Test item 1

Key and outline answers

At the end of the booklet, chapterwise key to answers or expected responses is given. In some cases outline of answers has been mentioned. But in case of some short answer type and almost all essay type test items only references of page and para number of the text book (Part I, Volume 1 & 2, 1977 edition) are mentioned. At some places actual figure numbers with captions given in the text book have also been used.

The teachers, based on their actual classroom experience, can better judge the type of test items involved in testing a particular objective such as understanding, application etc. No marks are allotted to the answers in the key. It is better if the teacher decides on his own the distribution of marks, depending on type, time, nature and purpose of giving the test items to the students. Generally it is convenient to give one mark for each objective type test item, one to two marks for short answer and five to ten marks for essay type questions. It is only suggestive and would rest with the teacher as per his needs.

CHAPTER I

Microscopic Structure of Mammalian Tissues

Completion Type

Fill in the blanks with the suitable words.

0101. The smaller type of branched processes of a neuron are called.......

0102. Part of the cytoplasm containing neurofibrils and continuing in the axon is called............

0103. The layer lining the bone marrow cavity is known as..........

0104. The cartilage cells are known as............

0105. The......are bone cells.

0106. ......is the hardest tissue of the body.

True-False Type

Write T if the statement is true, F if it is false.

0107. Canaliculi run longitudinally in a mammalian bone.

0108. Cheek cells possess matrix.

0109. Heparin secreted by the mast cells helps to prevent coagulation of blood in the vessels.

0110. The areolar tissue has predominance of reticular fibres.

0111. Haversian sytem is a characteristic of mammalian bones.

0112. Monocytes have multilobed nucleus.

0113. In an adipose cell the cytoplasm and nucleus is pushed towards one side due to the accumulation of fat.

0114. The total RBC count is 5,000 to 7,000 mm^3.

Multiple Choice Type

Tick ($\surd$) mark the correct answer in each of the following cases.

0115. In the stratified epithelium the basement membrane is in contact with the

a. upper layer.
b. second layer.
c. middle layer.
d. lower most layer.

0116. Microvilli are a

a. group of tissues.
b. group of cells.
c. group of cell inclusions.
d. cell organelles.

0117. In fibrous connective tissue, the matrix is produced by the

a. wandring cells.
b. fibroblasts.
c. plasma cells.
d. mast cells.

0118. In a nerve fibre the outermost layer is the

a. schwann's white substance.
b. peritoneal layer.
c. neurilemma.
d. myelin sheath.

0119. Nissl bodies are found in

a. cartilage cell.
b. nerve cell.
c. muscle cell.
d. epithelial cell.

0120. Different fibres of connective tissue are made of special types of proteins. The white fibres are made of

a. collagen.
b. elastin.
c. myocin.
d. reticulin.

0121. Medullated nerve fibres are present in the
- a. spinal nerves.
- b. autonomic nervous system (A.N.S.).
- c. central nervour system (C.N.S.).
- d. peripheral nervous system (P.N.S.).

0122. The layer of epidermis which contains the dividing cells is called the
- a. stratum corneum.
- b. stratum malpighii.
- c. stratum lucidum.
- d. stratum granulosum.

0123. The sensation in the skin is perceived by
- a. the epidermis.
- b. subcutaneous fatty layer.
- c. the dermis.
- d. pigment cells.

Matching Type

Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Histiocytes.	a. haemoglobin.
B. Mast cells.	b multinucleated.
C. Microvilli.	c. production of histamine and heparin.
D. Plasma cells.	d. secretion and absorption.
E. Erythrocytes.	e. ingestion of cell debris, bacteria and foreign matter.
F. Striated myofibrils.	f. synthesis of antibodies.
	g. product of fibres and matrix.

Classification Type

Which one of the following belongs to a distinct class or category.

0125. a. lymphocytes b. monocytes c. leucocytes d. erythrocytes

0126. a. sebaceous glands b. sweat glands c. mucous glands
d. adrenal glands

0127. a. periosteum b. canaliculi c. lamellae d. perichondrium

0128. a. ligament b. tendon c. adipose tissue d. neuron

Analogy Type

Observe the relationship between the first two words and then fill in the suitable word at the fourth place.

0129. Cartilage : perichondrium : : bone :..................

0130. Haemopoiesis : blood cells : : lymph cells :..................

0131. Myofibril : sarcolemma : : neurofibril :........................

0132. Birds : feathers : : fishes :.......................

Short Answer Type

Differentiate between the following pairs, giving two points of differences only.

0133. Stereocilia and cilia.

0134. Villi and microvilli.

0135. Stratified epithelium and pseudostratified epithelium.

0136. Yellow and white fibres.

0137. Haemopoiesis and lymphopoiesis.

0138. Cartilage and bone.

0139. Osteocytes and chondrocytes.

0140. Node and node of Ranvier.

0141 Sweat glands and sebaceous glands.

0142. Eosinophil and basophil.

0143. At what stage is the mammalian erythrocyte found nucleated and when enucleated ?

0144. Name an organ and a tissue both helping in the thermo-regulatory function.

Essay Type

0145. Enumerate the cell types of connective tissue and give their functions.

0146. "The skin plays an important role in metabolism"—Discuss the statement

Write short notes on the following :

0147. Respiratory function of skin.

0148. Skin derivatives.

0149. Functions of blood.

0150. Haversian canal and Haversian system.

0151. Functions of skin.

Structured Type

0152. Explain the structure of skin with the help of a well labelled diagram of the V.S. of skin.

0153. A student was given two slides A and B for identification. He examined the slides under the microscope, and recorded his observations as follows :-

slide A :- consists of large number of disc shaped cells without nucleus and a few large irregular cells with rounded nuclei, with bilobed, kidney shaped and round nuclei

Slide B :- consists of a number of spaces laying in a homogenous material having one or two uninucleated cells inside each space.

What comments will he write for his identification of A and B ?

0154. You are provided with a small piece of tissue in a watchglass containing a little amount of water. How will you proceed to identify whether it is epithelial tissue or the muscle fibres ?

Master List Type

0155. A. epithelial tissue B. connective tissue C. muscular tissue D. nervous tissues

Which of the above tissues are associated with the following statements ?

a. The tissue which helps in the storage of fat.

b. The tissue which protects body.

c. The tissue which supports and gives a definite shape to an organism.

d. The tissue which helps to produce saliva at the sight of the delicious food.

e. The tissue that secretes digestive enzymes in the stomach.

f. The tissue which helps to lift heavy weight.

g. The tissue which is concerned with memory.

h. The tissue which secretes milk during lactation.

0156. In the table on next page, 10 characters are written in column A to J and major animal tissues are written at the beginings of lines 'a' to 'd'. Tick (√) mark for each tissue under the columns of characters, which are present in the tissue.

SECTION I

Stomach consists of four main coats with certain characteristic differences. The outer serous coat consists of peritoneum. The muscular coat consists of three layers—the outer longitudinal, the middle circular and the inner oblique layer. Next comes the submucous coat, then comes the layer of muscularis mucosae and a supporting stroma of connective tissue. This layer of muscle also consists of an outer longitudinal and an inner circular layer, finally comes the mucous membrane which is thrown out into large folds called rugae when the stomach is empty. These folds tend to disappear when the stomach is distended. The stomach also shows strong peristaltic movement.

Read the above para carefully, then tick (√) mark the correct nswer in each of the following cases.

0157. The folded arrangement of the mucous membrane is to facilitate

a. glandular secretion.

b. absorption.

c. protection against rupture.

d. elimination of wastes.

Characters of Tissues *Major tissues*	*A. Uninucleated Cells*	*B. Multi. Nu. Cells*	*C. Protective*	*D. Trans. Nutrition*	*E. Absorption*	*F. Response to stimuli*	*G. Volunt. movement.*	*H. Supply to abdo. organ.*	*I. Involuntary movement.*	*J. Sensation*
a. Epithelial tissue										
b. Connective tissue										
c. Muscular tissue										
d. Nervous tissue										

0158. The major part of the stomach wall is occupied by the
- a. epithelial tissue.
- b. connective tissue.
- c. muscular tissue.
- d. nervous tissue.

0159. Mucus is secreted in the stomach by the
- a. muscularis mucosae.
- b. oblique muscle layer.
- c. layer forming rugae.
- d. submucous coat and stroma.

SECTION II

The connective tissue connects or supports other tissues and organs. It is made of cells and extracellular materials like the fibres and ground substance called matrix, usually secreted by the cells.

The matrix is composed of several polysaccharides including hyaluronic acid. Connective tissue varies in relation to its inner cellular matrix. Thus there are adipose, areolar, fibrous and cartilaginous connective tissue as well as bone. The bone is covered with periosteum the underlayer of which contains osteoblasts essential to bone formation and repair. In the connective tissue the intercellular material dominates the entire structure.

Read the above para carefully, then tick (√) mark the correct answer in the following cases.

0160. Blood a fluid connective tissue, is a controversial point because
- a. it contains erythrocytes and leucocytes.
- b. the plasma is a secretion of mast cells.
- c. matrix is a secretion of blood cells.
- d. plasma is not a secretion of blood cells.

CHAPTER 2

Digestive System

Completion Type

Fill in the blanks with suitable words.

0201. The outermost tissue layer of the stomach wall including the epithelium is known as...............

0202. The main tissue layer next to the outermost layer of stomach wall is known as...............

0203. The outermost mainlayer of stomach wall is made of.........tissue.

0204. The second layer of tissue (from outside) of the stomach is made of smooth....................fibers................

0205. The largest gland in the body of man is the..........................

0206. The outer linning of the intestine wall is known.....................

0207. The meat eaters are called...............

0208 Mucus is the secretion of.............cells.

0209. The layer of connective tissue fibre supporting the gastric glands is known as...............

0210. The lymphatic vessel enclosed inside the villus is known as...............

0211 The................cells of the villus produce digestive enzymes.

0212. The food passes from the pharynx through the...............into the stomach.

0213. ....prevents the entry of food into the trachea.

0214. In addition to hormonal control, the secretion of digestive enzymes is regulated by the...............

0215. The medium in which ptyalin acts is slightly................because its pH is 6.7.

0216. The three pairs of salivary glands present in the body are the ...., ...and sublingual glands.

0217. Swallowing is initiated by the voluntary action of the...............

0218. Involuntry contractions of....................muscles push the food material into the oesophagus.

0219. We cannot swallow with................mouth.

0220. Peristaltic movement of the stomach wall is controlled by........... nerves.

True-False Type

Write T if the statement is true, F if it is false.

0221. The pancreas is an exocrine gland only.

0222. The pancreas is both an exocrine and an endocrine gland.

0223. Mucin is secreted by the goblet cells of the intestine.

0224. Mucin is secreted by the Kupffer cells of the liver.

0225. The bile pigment (bilirubin) present in the blood plasma is produced by the blood corpuscles.

0226. The bile pigment (bilirubin) present in the blood plasma is produced by the hepatic cells.

0227. Jaundice is the outward manifestation of excess secretion of bilirubin of the integumentary cells.

0228. The digestive enzyme pepsin can function mainly in the acid medium.

0229. During digestion trypsinogen is converted into trypsin by enterokinase secreted by the pancreas.

0230. Pepsinogen is the active form of pepsin.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0231. The cells that produce dilute hydrochloric acid in the stomach are
- a. parietal cells.
- b. goblet cells.
- c. digestive cells.
- d. paneth cells.

0232. The isolated patches of lymphoid tissue of the intestine is known as
- a. hepatic cells.
- b. islets of Langerhans.
- c. Peyer's patches.
- d. Kupffer cells.

0233. The hormone that influences the flow of bile is
- a. secretin.
- b. pancreozymin.
- c. cholecystokinin.
- d. enterogastrone.

0234. The inner most layer of the stomach is called
- a. peritoneum.
- b. serosa.
- c. mucosa.
- d. subserosa.

0235. The lack of vitamin A causes
- a. beri-beri.
- b. scurvy.
- c. night blindness and xerophthalmia.
- d. rickets.

0236. Which of the following constituents is regarded as the rich source of vitamin C ?
- a. Liver
- b. Nuts
- c. Lemon
- d. Soyabean

0237. The clotting of blood is partially dependent upon

a. vitamin K.
b. vitamin E.
c. vitamin A.
d. vitamin B.

0238. In addition to vitamins, the body also requires some minerals. Amongst these minerals iron is specifically necessary for

a. bone formation.
b. thyroxin formation.
c. adrenalin formation.
d. haemoglobin formation.

0239. The disease produced in the human body due to deficiency of iodine is

a. goitre.
b. anaemia.
c. bone abnormalities.
d. leukemia.

0240. The bile is produced in the

a. gall bladder.
b. pancreas.
c. liver.
d. duodenum.

0241. The function of the bile salts is

a. to catalyse chemical reactions.
b. to emulsify the fats.
c. regulation of enzyme.
d. absorption.

0242. Ptyalin is synthesized by the

a. salivary glands.
b. duodenum.
c. pancreas.
d. oesophagus.

0243. The enzymes of mammalian body become inactivated beyond optimal temperature because of
- a. denaturation of carbohydrates.
- b. denaturation of proteins.
- c. denaturation of fats.
- d. degeneration of tissues.

0244. The gastric enzyme pepsin can break down proteins into peptones in a medium which is
- a. strongly alkaline.
- b. weakly alkaline.
- c. acidic.
- d. at a neutral pH.

0245. Liver, the biggest gland in the body, is concerned with the secretion of
- a. hormones controlling digestion.
- b. digestive enzymes.
- c. bile.
- d. mucus.

0246. The precursor of trypsin is synthesized in the
- a. stomach.
- b. duodenum.
- c. liver.
- d. pancreas.

0247. The enzyme erepsin helps to break down peptones into amino acids in the
- a. stomach.
- b. duodenum.
- c. large intestine.
- d. pancreas.

0248. The muscular movement of the alimentary canal is known as
- a. cyclosis.
- b. peristalsis.
- c. maceration.
- d. metachronal waves.

0249. Deficiency in the quantity of vitamin D causes

- a. haemorrhage.
- b. rickets.
- c. scurvy.
- d. beri-beri.

0250. Deficiency in the quantity of vitamin C causes

- a. haemorrhage.
- b. scurvy.
- c. muscular dystrophy.
- d. reproductive impairment.

0251. Which of the following enzymes is absent in man ?

- a. Cellulase
- b. Maltase
- c. Lactase
- d. Sucrase

Matching Type

Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Amylase.	a. break down of sucrose.
B. Pepsin.	b. break down of lipid.
C. Lipase.	c. break down of protein.
D. Sucrase.	d. break down of starch.
	e. break down of maltose.

	Column I	*Column II*
0253.	A. Mouth.	a. digestion of protein.
	B. Stomach.	b. swallowing.
	C. Intestine	c. mastication.
	D. Anus.	d. egestion.
		e. digestion and absorption.

Short Answer Type

0253. Why does the stomach not digest itself ?

0254. How is gastric ulcer induced ?

0255. What are the factors responsible for constipation ?

0256. Mention two points in regard to the physiological conditions of diarrhoea ?

Essay Type

0257. Describe the sturctural organisation of the wall of small intestine and state its functional significance.

0258. Describe the role of the mouth and buccal cavity in digestion.

0259. Briefly discuss the caloric value of food in relation to protein, carbohydrate and fat.

0260. What happens to the different food constituents after digestion in the alimentary canal ?

0261. How is protein digested in the alimentary canal ?

0262. Describe the fate of the carbohydrates in the alimentary canal.

0263. Give an account of carbohydrate metabolism in the body.

0264. Give a brief idea of basic metabolic rate (BMR).

Structured Type

0265. Give a schematic representation of the major steps in glycolysis.

0266. Give a scheme of the Krebs cycle mentioning the major steps of chemical reactions.

0267. Schematically illustrate how fats and proteins enter in the Krebs cycle.

0268. Draw a neat diagram of the alimentary system of man and label the parts.

Terminology Type

Supply the specific scientific terms for the following :-

0269. The expulsion of food contents along with the digestive secretion from the stomach and intestine through the mouth.

0270. The erosion of gastric or duodenal serosa by the hydrochloric acid.

0271. The process of break down of complex organic food substances inside the body into simple chemicals resulting in the liberation of energy.

0272. The process of synthesis of complex organic substances with the utilisation of energy for the body.

0273. The conversion of glucose into glycogen.

0274. The conversion of amino acids into carbohydrate.

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Date 22.3.94
Acc. No. 8026

CHAPTER 3

Respiratory System

Completion Type

Fill in the blanks with suitable words.

0301. The oxidation of food substances in the body to release energy is called ....

0302. The process of lung respiration involves.........and.............

0303. Exchange of air between the external environment and the alveoli creates..of the lungs.

0304. . ...prevents the passage of food particles into the respiratory tract.

0305. The presence of..............prevents the trachea from collapsing.

0306. Mucous cells and cilia of the trachea prevents.........and......... entering the air passages of the lungs.

0307. The alveolar lining is made up of a simple cuboidal.....epithelium.

0308. The amount of air that moves out with each expiration is known as................................

0309. Haemoglobin has greater affinity for....................than for O_2.

0310. Tuberculosis can be prevented by the............

0311. Nicotine has harmful effect on...lungs, ...and digestive organs.

True-False Type

Write T if the statement is true, F if it is false.

0312. Diaphragm is the only organ which helps in the mechanism of respiration.

0313. The whole respiratory tract is internally lined by endothelium.

0314. In mammals the left lung is larger than the right lung.

0315. The lower surfaces of lungs in mammals are concave.

0316. The gaseous diffusion takes place across the dry respiratory epithelium.

0317. A decrease in the concentration of CO_2 in arterial blood causes the acceleration of the rate of respiration.

0318. An increase in the concentration of CO_2 in arterial blood causes the acceleration of the rate of respiration.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0319. The common passage for food and air in mammals is the
- a. oesophagus.
- b. pharynx.
- c. glottis.
- d. larynx.

0320. Epiglottis gaurds the opening of the
- a. pharynx.
- b. larynx.
- c. glottis.
- d. trachea.

0321. The exchange of gases between the alveolar air and alveolar capillaries takes place by
- a. exosmosis.
- b. diffusion.
- c. active transport.
- d. endosmosis.

0322. With the increase of temperature the respiratory rate will
- a. increase.
- b. decrease rapidly.
- c. remains unaffected.
- d. decrease slowly.

0323. The oxygen carrying pigment (Haemoglobin) in mammals is present in the

a. plasma.

b R B C.

c. W.B.C.

d. blood platelets.

0324. The covering of the lung is known as the

a. pericardium.

b. perichondrium.

c. pleural membrane.

d. peritoneum.

0325 The trachea is prevented from collapsing due to the presence of

a. bony rings.

b. cartilagenous rings.

c fibrous tissue.

d. muscles.

0326 In mammals the right lung is divided into

a. 8 segments.

b. 2 segments.

c. 10 segments.

d 12 segments.

0327. In mammals the left lung is divided into

a. 8 segments.

b. 9 segments.

c. 10 segments.

d. 12 segments.

0328. The epithelium in the conducting bronchioles (tertiary bronchi) is

a stratified epithelium.

b. only pseudostratified epithelium.

c. pseudostratified and columnar epithelium.

d. squamous epithelium.

0329. The terminal bronchiole is lined by
a. stratified epithelium.
b. pseudostratified epithelium.
c. ciliated columnar or cuboidal epithelium.
d. columnar or cuboidal epithelium.

0330. In the terminal bronchiole which of the following is present ?
a. Mucous cells.
b. Cartilage.
c. Only elastic fibres.
d. Elastic and recticular fibres.

0331. The index of pulmonary function is the
a. air left in the lung after a maximum forced exhalation.
b. greatest amount of air that can be expired after a maximal inspiratory effort or inspiration.
c. amount of air that moves out with each normal inspiration.
d. amount of air present in the the lung at a time.

0332. The centre for the regulation of respiration is present in the
a. optic lobes.
b. cerebral hemisphere.
c. olfactory lobes.
d. medulla.

0333. When the separating wall of the alveoli break-up and the gas exchange area of the lung is reduced, the state is known as
a. pneumonia.
b. tuberculosis.
c. emphysema.
d. cough.

0334. Tobacco contains
a. morphine.
b. caffine.
c. nicotine.
d. tanin.

Short Answer Type

0335. Why are the mucous cells absent in the terminal bronchioles ?

0336. What are the devices for the protection of lungs in mammals ?

0337. What peculiarities are present in mammalian lung which are surgically important ?

0338. Trace the path of O_2 from trachea in the following organs in a proper sequance :

1. Bronchi
2. Bronchioles
3. Alveolar ducts
4. Respiratory bronchioles
5. Terminal bronchioles
6. Alveolar capillaries
7. Cell
8. Tissue capillaries

0339. What do you understand by the residual volume of lung?

0340. What do you mean by the vital capacity of lung?

0341. Define tidal volume.

0342. What will be the effect on rate of respiration if there is increase in the concentration of CO_2 in arterial blood?

0343. Name the compound that is formed when air rich in CO is inhaled.

0344. What are other respiratory pigments present in animals besides haemoglobin? How is pneumonia caused ?

0345. What is the full name of BCG ?

0346. Why smoking is bad for health ?

Essay Type

0347. How chocking and coughing is caused ?

0348. What is the pathway of air during respiration ?

0349. In what way does the process of inspiration differ from expiration ?

0350. Discuss the role of the diaphragm and intercostal muscles during inspiration and expiration.

0351. What is asphyxiation and how is it caused?

Structured Type

0352. Draw a well labelled diagram of transverse section of a part of mammalian lung.

CHAPTER 4

Circulatory System

Completion Type

Fill in the blanks with suitable words.

0401. The bilobed nucleus is present in..............and..............cell in blood.

0402. The Rh factor is a type of blood protein which was found for the first time in the blood of....................

0403. The blood vessels carrying blood away from the heart are called..............

0404. Blocking of a coronary artery by the presence of a small clot causes....................

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0405. The circulation of blood was first discovered by

a. Aristotle.

b. Charles Darwin.

c. William Harvey.

d. Mendel.

0406. Which of the following blood group is a universal recipient ?

a. A

b. B

c. AB

d. O

0407. The blood is a

a. reticular connective tissue.
b. supportive connective tissue.
c. loose connective tissue.
d. fluid connective tissue.

0408. The heart is enclosed in a double walled membranous sac called the

a. pericardium.
b. periosteum.
c. perichondrium.
d. peritoneum.

0409. The heart of a frog is

a. two chambered.
b. three chambered.
c. incomplete four chambered.
d. four chambered.

0410. The heart beat per minute of an adult healthy person is

a. 80 to 90 times.
b. 70 to 80 times.
c. 70 to 80 times.
d. 90 to 100 times.

0411. The opening of the articles into the ventricles is knows as the

a. sinu-auricular aperture.
b. auriculo-ventricular aperture.
c. foramen ovale.
d. foramen magnum.

0412. The vein which carry oxygenated blood is the

a. pulmonary artery.
b. pulmocutaneous.
c. pulmonary vein.
d. coronary artery.

041 3. The vessel which supplies blood to the heart is

- a. pulmonary vein.
- b. coronary artery.
- c. coronary vein.
- d. superior venacava.

0414. The auriculo-ventricular node (AV node) in human heart was discovered by

- a. William Harvey.
- b. Otto Loewis.
- c. His.
- d. Ringer.

Matching Type

0415. Match the items in column I with the appropriate items in column II.

Column I	*Column II*
A. Hardening of the coronary vessels	a. anginapectoris
B. Blocking of the coronary artery by clot	b. achycardia
C. Severe pain in breast due to inadequate supply of oxygen to the heart	c. heart block
D. The increased heartbeat rate	d. coronary thrombosis
	e. heart attack

Classification Type

Which one of the following belongs to a distinct class category.

0416. a. Pulmonary artery. b. neural canal.
c. Inferior venacava. d. superior venacava.

0417. a. Heart attack. b. hypertension.
c. Coronary thrombosis. d. diabetes.

0418. a. Thrombocyte. b. melanocytes.
c. Leucocytes. d. erythrocytes.

Analogy Type

Observe the relationship between first two words and fill in the suitable words at the fourth place.

0419. red blood corpuscle : 4.5 to 5.5 million/cubic millimetre of blood : : white blood corpuscle : .

0420. 0 blood group : univesal donor : : AB blood group : .

0421. contraction of the heart: systole : : relaxation of the heart : .

0422. high blood pressure : hypertension : : low blood pressure : .

Short Answer Type

Differentiate between the following.

0423. Artery and vein.

0424. Universal donor and universal recipient.

0425. Closed circulatory system and open circulatory system.

0426. Natural and acquired immunity.

0427. Allergy and Anaphylactic shock.

0428. Pulse rate and blood pressure.

Essay Type

0429. Explain the clotting of blood and its importance.

0430. Explain the Rh factor and its significance.

0431. Name the valves present in the heart and state their functions.

0432. Mention the stages of heart sounds.

0433. Describe the structure and functions of spleen.

0434. Describe the various abnormal conditions of the heart.

0435. Explain fully the structure and working of human heart.

0436. Describe fully the composition of blood and its functions.

Structured Type

0437. Draw a labelled diagram to show the course of circulation of blood from left ventricle to right auricle.

0438. Draw a labelled cross sections of an artery and a vein to show the differences between the two.

0439. Show schematically, the process of coagulation of blood.

Thought Type

0440. The heart beat is regulated by two nerves. One, the vagus nerve which slows down the rate of the beats, while the other accelerator nerve, accelerates the heart beat. In an experiment two frog hearts are arranged one above the other. If the vagus of the top heart is stimulated, this heart slows down but so does the second heart which has no connection with the first heart except through the fluid, therefore, there must be a chemical substance which causes the effect. The substance released from the nerve endings of vagus nerve is known as acetylcholine while adrenalin is the product of accelerator nerve.

Indicate, which of the following statements are true:

1. The beating of heart is under the control of sympathetic nervous system directly.
2. The heat beatings are due to accelerator nerve only.
3. Heart slows down due to the effect of a substance known as acetylcholine.
4. Increasing and decreasing in the rate of heart beats are governed by the substances released from accelerator and vagus nerves.
5. The heart beatings are under the control of vegus nerve only.

CHAPTER 5

Excretory System

Completion Type

Fill in the blanks with suitable words.

0501. The excretory organs of annelids are the.............................

0502. The insects perform their function of excretion with the help of the..

0503. The main excretory organ of man is the...............................

0504. Urine is a by product of.........activity.

0505. In Hydra, ammonia.......into the water directly from the.........in which it is produced.

0506. The Kidney is composed of two parts, an outer...and an inner.....

0507. Urine is carried from the kidney through...to the urinary bladder.

0508. The numerous functional units of the kidney are known as the....

0509. The exact site of filtration of blood in the kidney is the............

0510. Filtration of blood to form urine involves....pressure.

0511. The reabsorption of water and glucose takes place in the.......of a nephron.

0512. Reabsorption of water in the nephron is controlled by.... and..... hormones.

0213. The hormones controlling the reabsorption of water in a nephron are secreted by the——and......glands.

0514. Increased urinary flow is caused by suppression of ADH secretion by application of some drugs and................ .

0515. Glucose is.... in normal urine collected from the Henle's loop.

0516. Degradation of amino acids results in the formation of............ .

0517. Urea is a combination of..............and:................. .

0618. Birds excrete uric acid which is a converted form of............ .

0519. In reptiles and birds, uric acid is formed mostly in the......... .

0520. Uric acid is eliminated from the body along with faeces in the..... .

0521. In insects, uric acid is systhesized in the............ .

0522 In insects, uric acid is poured into the alimentary canal by the... ....

0523. If examination of urine shows the presence of R.B.C. and/or protein then it is a case of defective.............. .

True-False Type

Write T if the statement is true, F if it is false.

0524. Excretory products are harmful for the body because they are toxic.

0525. Urine is acidic in nature.

0526. The kidneys are not concerned with the loss of water from the body.

0527. The renal tubules are formed of only connective tissue.

0528. Brush border is the characteristics of the cells constituting renal tubule.

0529. A fresh water fish has lower concentration of salts in the blood than in water.

0530. The nitrogenous wastes are the catabolic products of dietary lipids.

0531. Urea is produced in the liver.

0532. In the case of Nephritis, the kidney tubules remain unaffected.

0533. During filtration the osmotic pressure of the plasma proteins opposes the pressure exerted by the arterioles present in the glomerulus.

0534. Renal filtration is associated with the blood pressure in the glomerulus.

0535. Angiotensin is the active form of angiotensinogen which is produced in the kidney.

0536. The cortical hormone aldosterone is produced in the adrenal medulla.

0537. Aldosterone influences the level of sodium in the blood.

0538. Osmoregulation is a phenomenon associated with the regulation of osmotic pressure in the body.

0539. Absorption of sodium is completed within the Henle's loop.

0540. The usual *net filtration pressure* of the glomerulus is—25 mm Hg.

0541. The glomerular filtration rate in a normal adult is 120 ml/minute.

0542. Urine is the only excretory product of the body.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0543. The nitrogenous wastes produced in the body of human female are mostly removed by the

a urinary aperture as ammonia.

b. urinary aperture as uric acid.

c. urinogential aperture as urine.

d. urinary aperture as urine.

0544. In birds, the nitrogenous wastes are conveyed to the exterior directly through the

a. urinary aperture.
b. urinogenital aperture.
c. cloacal aperture.
d. oral aperture.

0545. The elimination of uric acid is designated as

a. uricotelism.
b. ureotelism.
c. ammonotelism.
d. urination.

0546. In addition to certain inorganic ions and hypporic acid, urine in man is composed of

a. ammonia and water.
b. ammonia and urea.
c. ammonia, urea and water.
d. ammonia, urea, uric acid and water.

0547. In insects, the uric acid is temporarily stored in the

a. cloaca.
b. fat bodies.
c. liver.
d. anal cerci.

0548. Carbon dioxide is an excretory product because it is formed during

a. anabolism.
b. metabolism.
c. deamination.
d. decarboxylation.

0549. Carbon dioxide formed in the cells of the body diffuses into the blood wherefrom it is carried to the lungs normally as the

a. carboxyhaemoglobin.
b. carbonic acid.
c. calcium carbonate ($CaCo_3$).
d. sodium bicarbonate ($NaHCO_3$).

0550. Proximal convoluted tubules are lined by epithelial cells which are

a. pyramidal.
b. columnar.
c. cuboidal.
d. ciliated columnar.

0551. Distal convoluted tubules are lined by
a. columnar cells.
b. pyramidal cells.
c. cuboidal cells.
d. areolar cells.

0552. The collecting tubules are lined by
a. columnar cells only.
b. cuboidal cells only.
c. ciliated columnar cells.
d. both columnar and cuboidal cells.

0553. The disease *Diabetes mellitus* is diagonised by the occurrence in the urine of

a. maltose.
b. insulin.
c. glucose.
d. lactose.

0554. Urea is formed by the combination of
a. ammonia with uric acid.
b. ammonia with amino acid.
c. ammonia with CO_2.
d. ammonia with O_2.

0555. The vessel taking waste-free blood away from the Bowman's capsule is known as

a. afferent arteriole.
b. efferent arteriole.
c. renal artery.
d. renal vein.

0556. The vessel leading blood (containing nitrogenous waste) into the Bowman's capsule is known as

a. afferent arteriole.
b. efferent arteriole.
c. renal artery.
d. renal vein.

0557. The cavity of the kidney which leads into the ureter is called

a. renal pelvis.
b. renal tubule.
c. Bowman's capsule.
d. Henle's loop.

Matching Type

0558. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Glomerulus.	a. reabsorption.
B. Proximal tubes.	b. reabsorption and secretion.
C. Henle's loop.	c. filtration.
D. Collecting tubule.	d. osmoregulation.
	e. reception of uric acid.

Analogy Type

0559. Observe the relationship between the first two words and fill in the suitable words at the fourth place.

a. Protein : Nitrogenous waste : : Carbohydrate :............ .
b. Call bladder : Bile : : Urinary bladder :............ .
c. Man : Kidney : : Insects :............ .
d. Urinary aperture : Urine : : Nasal aperature :............ .
e. Adrenal cortex : Aldosterone : : Kidney :............ .
f. Posterior pituitary : Antidiuretic hormone : : Liver :......... .
g. Trypsinogen : Trypsin : : Angiotensinogen :............ .
h. Fatty acid : Fat : : Amino acid :............ .

Short Answer Type

0560. Enumerate the major steps of urine formation.

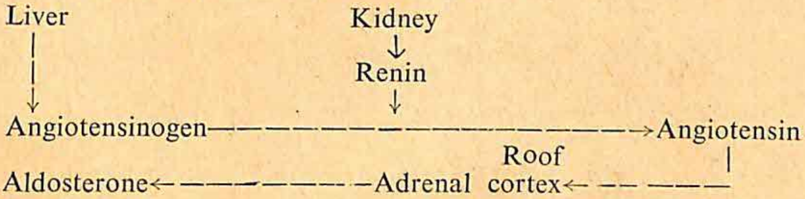
0561. Name the different forms of excretory products in a human body.

0562. Define excretion.

0564. Name some of the excretory organs found in different animals.

0564. What is ammonotelism?

0565. Observe and explain the following scheme



0566. How does excretion differs from egestion?

Structured Type

0567. Depict the formation of various types of wastes during oxidation of carbohydrate, fat and protein.

0568. Draw and label the structure of kidney.

0569. Draw and label the structure of a Bowman's capsule of the nephron.

CHAPTER 6

Nervous System

Completion Type

Fill in the blanks with suitable words.

0601. The central nervous system consists of the brain and the.........

0602. The nervous system of all vertebrates including that of man is divisible into...........parts.

0603. The olfactory lobes in man are very small and visible only in a ....view.

0604. The medulla oblongata continues as the...........which runs in the canal of the backbone.

0605. The grey matter is largely filled with interneurons, motor neurons, ...and dendrites.

0606. The cell bodies of neurons in the grey matter are often clustered together with other neurons having similar functions into groups called the........... .

0607. The peripheral region of the spinal cord is the...........consisting of nerve axons which transmit nerve impulses between different levels of the spinal cord.

0608. When movements occur without the intervention of the brain they are called........... .

0609. The autonomic nervous system consists of two components, the sympathetic and...........systems.

0610. The single axon is long and is referred to as the........... .

0611. Connection between two neurons is called a............ .

0612. Acetylcholine is a............transmitter.

0613. In the............phase the axon is again positively charged on the outside and negatively charged on the inside due to an active transport of sodium ions outside the axon.

0614. At the............junctions acetylcholine is released which triggers muscle contraction.

0615. The wall of each eye is made up of three concentric layers, namely, the anterior most is............, the middle one is choroid, and the innermost is retina.

0616. In the............of the nerve fibre the membrane is 30 times more permeable to potassium ions than to sodium ions.

0617. When the nerve fibre is stimulated electrically, mechanically, thermally or chemically, a disturbance is set up at the point of stimulation which is called the local............ .

0618. The change in the membrane potential is called the............

0619. The nerve impulse can travel along an axon at different............

0620. The eyes are lodged in the deep cavities of the skull called......

0621. The rods are sensitive to dim-light and contain a brown pigment called rhodopsin which is formed from............ .

0622. The cone cells are sensitive to............and enable us to see the three primary colours.

0623. Far sightedness is due to defective accommodation and is corrected by wearing suitable............lenses.

0624. The sensory cells in the nose are sensitive to............substances.

True-False Type

Write T if the statement is true, F if it is false.

0625. Neuron is a structural and functional unit of the renal tissue.

0626. Vagus is twelfth cranial nerve.

0627. Facial is seventh cranial nerve.

0628. Optic is fourth cranial nerve

0629. The middle layer of eye wall is sclerotic.

0630. The rods contain a brown pigment called rhodopsin.

0631. The surface of the tongue carries a large number of poison buds.

0632. The internal ear is not delicate.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0633. All functions of the body are regulated and integrated by the
   a. respiratory system.
   b. digestive system.
   c. neuroendocrine system.
   d. excretory system..

0634. Nervous system is concerned with two important functions:
   a. It regulates the external environment and responds to internal environment through sense organs.
   b. It regulates the internal environment and responds to external environment through sense organs.
   c. It regulates the external environment and responds to internal environment through motor nerves.
   d. It regulates the internal environment and responds to external environment through motor nerves.

0635. A deep longitudinal fissure divides the cerebrum
   a. into six hemispheres.
   b. into four hemispheres.
   c. into two hemispheres.
   d. into eight hemispheres.

0636. The surface of the cerebral hemispheres
   a. has numerous spines.
   b. has numerous convolutions.
   c. has numerous water bodies.
   d. has numerous cone like structures.

0637. The medulla oblongata continues as the
- a. optic nerve.
- b. cranial nerve.
- c. spinal cord.
- d. respiratory system.

0638. The number of cranial nerves in a human body is
- a. 24 pairs.
- b. 18 pairs.
- c. 12 pairs.
- d. 5 pairs.

0639. When movements occur without the intervention of the brain they are called
- a. cranial reflexes.
- b. spinal reflexes.
- c. afferent reflexes.
- d. efferent reflexes.

0640. A neuron is a
- a. structural and functional unit of the nervous system.
- b. structural and functional unit of the endocrine system.
- c. structural and functional unit of the muscular system.
- d. structural and functional unit of the Osteosystem.

0641. Synapse is a term to denote the
- a. connection between two arteries.
- b. connection between two veins.
- c. connection between two neurons.
- d. connection between two lungs.

0642. Excitability and conductivity are the
- a. outstanding properties of the nerve fibre.
- b. outstanding properties of an artery.
- c. outstanding properties of the vein.
- d. outstanding properties of the spleen.

0643. The axon membrane shows a positive charge on the outside and negative charge inside, this is called the

a. action potential.
b. resting potential.
c. differential potential.
d reflex action.

0644. The duration of absolute refractory period of a nerve fibre is

a. 1/10 second.
b. 1/1000 second.
c. 1/100000 second.
d. 1/100 second.

0645. Saltatory conduction is

a. a jumping of the action potential.
b. a sleeping of the action potential.
c. a flowing of the action potential.
d. the membrane potential.

0646. At the nerve synapses

a. carbon dioxide is released.
b. oxygen is released.
c. neuro-transmitters are released.
d. nothing is released.

0647. The wall of the eye is made of

a. three main layers.
b. four main layers.
c. thirty main layers.
d. only one layer.

0648. The iris consists of delicate

a. ciliary muscles.
b. rough muscles.
c. soft muscles.
d. muscles without cilia.

0649. Near sightedness occurs when the image of distantly object is focussed

a. on the back of the retina.
b. above the retina.
c. in front of the retina.
d. below the retina.

0650. Astigmatism is due to irregularities

a. in the shape of the lens and cornea.
b. of pigments.
c. like myopia.
d. like conjunctivities.

0651. The nose is a

a. mechanoreceptor.
b. chemoreceptor.
c. thermal receptor.
d. cold receptor.

0652. The skin can perceive

a. ten types of sensations.
b. five types of sensations.
c. fifty types of sensations.
d. eight types of sensations.

Matching Type

Match the different items of Column I to the appropriate items in Column II.

	Column I	*Column II*
0653.	A. Two hemispheres of the cerebrum.	a. mammals.
	B. The medulla oblongata.	b. a fatty layer.
	C. 12 pairs of cranial narves.	c. anything as the impulses do not reach the brain.
	D. The outer surface of the axon.	d. colour blindness.
	E. A nerve cell specialisation.	e. a connection of horizontal sheet of fibrous is tissue.
	F. The outermost transparent, bulging, circular part of the separate layer,	f. beginning of spinal cord.

Column I	*Column II*
G. The iris consists of delicate ciliary muscles.	g. transmitting impulses.
H. Aqueous humour.	h. cornea.
I. No cones in their retina	i. regulation of the pupil.
	j. fills the space between the lens and the cornea.
	k. chemoreceptor.
	l. physiology.

Short Answer Type

0654. Mention two major functions of neuron.

0655. What is polarisation and depolarisation of the membrane?

0656. What is action potential?

0657. What is absolute refractory period?

0558. What is all or none-theory rule of nerve impulse.

0659. What are the taste buds?

0660. State the function of the taste buds.

0661. Name the cranial nerves of the human body.

Essay Type

0662. Write briefly about different parts and functions of the brain.

0663. What are the major changes that take place during the transmission of nerve impulse ?

0664. Write an account of the structures of the ear and their functions.

0665. Write briefly the functions of neurotransmitters.

0666. Explain the role of sensory and motor nerves.

0667. What is reflex action? Demonstrate the phenomenon by a simple experiment.

0668. List briefly the functions of the rods, cones and lens of the human eye.

0669. Write an essay on the mechanism of hearing in human ear.

Give the labelled sketch for the following:

0670. Human brain (L.S.)

0671. Human eye (M.V.S.)

0672. Human ear (A Sectional diagram)

0673. Nerve cell (Structure)

CHAPTER 7

Muscular System

Completion Type

Fill in the blanks with suitable words.

0701. Muscles are of two major types: (1) striated and (2)........... .

0702. The heart muscle is a special kind of...........muscle called the cardiac muscle.

0703. The non-striated muscle is also referred to as the...........muscle.

0704. The working of the skeletal muscle is under the control of our will and is known as...........muscle

0705. The muscle cells are called muscle fibres which are...........in shape in the skeletal muscle.

0706. Each type of muscle fibre is made of smaller units called......... .

0706. The myofibrils are formed of numerous........... .

0708. The dark band is called the...........band.

0709. The actin and myosin help in the...........of muscle.

0710. The...........is thus the functional unit of the contractile system in muscle.

0711. ....discs are specialised regions of cell membranes of two adjacent cardiac muscle fibres.

0712. The smooth muscles help in..........,movement of the stomach and intestine.

0713. As the muscle becomes shorter and shorter the ....and thin filaments slide past each other.

0714. The actual sites of contraction are the............ .

0715. Acetylcholine evokes the release of...........ions.

0716. Myosin binds actin to form actomyosin in the presence of...... . ...and calcium ions.

0717. Magnesium ions in addition to calcium ions are also essential for ....activity and for muscle contraction.

0718. ....helps in the immediate reconversion of ADP into ATP at the end of muscle contraction.

0719. The muscle also has a large store of...........which is broken down into lactic acid by a series of reactions.

0720. The force exerted by a contracting muscle on an object is known as the muscle............ .

0721. The force exerted on a muscle by the weight of an object is known as the............ .

0722. Tetanus is the result of...........stimulation of the muscle.

0723. The drop in the force, of contraction after prolonged stimulation is known as muscle............ .

0724. The accumulation of lactic acid leads to muscle............ .

0725. Energy released by the splitting of ATP is utilised by the........... to trap free calcium ions and thus induce relaxation.

0726. The cardiac muscle is controlled by the adrenergic and........... nerves.

True-False Type

Write T if the statement is true, F if it is false.

0727. The striated muscles are also called skeletal muscles.

0728. The non-striated muscle is not referred to as the smooth muscle.

0729. Nuclei are absent in the skeletal muscle fibre.

0730. The myofibrils are formed of numerous sarcomeres.

0731. Each sarcomere consists of irregularly arranged thick and thin protein filaments.

0732. The smooth muscle fibres also have actin and myosin which are aggregated into filaments.

0733. The skeletal muscle never helps in the movement of different parts of the body.

0734. The smooth muscle is not found in the visceral organs.

0735. The chemical events associated with the muscle contraction have been worked out by Huxley.

0736. A motor nerve stimulates a muscle not by the release of acetylcholine from the vesicles at the end plate.

0737. The energy released due to the splitting of ATP is not directly coupled to the movement of cross bridges.

0738. The muscles and tendons lack stretch receptors.

0739. The increase in the size of individual muscle fibres is known as muscular hypertrophy.

0740. The denervated muscle increases in size.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0741. The non-striated muscle is also referred to as the

a. cardiac muscle.

b. smooth muscle.

c. skeletal muscle.

d. involuntry muscle.

0742. The smooth muscle fibre has only.
- a. one peripherally located nucleus
- b. one centrally located nucleus.
- c. one dorsally located nucleus.
- d. one ventrally located nucleus.

0743. Each sarcomere consists of regularly arranged thick and thin
- a. carbohydrate filaments.
- b. fat filaments.
- c. protein filaments.
- d. vitamin filaments.

0744. The dark band of the protein filament is called the
- a. anisotonic band.
- b. isotonic band.
- c. isometric band.
- d. isotropic band.

0745. The light band of the protein filament is called the
- a. isotropic band.
- b. isotonic band.
- c. isometric band.
- d. anisotropic band.

0746. The actin and myosin help
- a. in the shortening of the muscle.
- b. in the expansion of the muscle.
- c. in the relaxation of the muscle.
- d. not in the contraction of the muscle.

0747. The smooth muscle is found in
- a. all the visceral organs.
- b. urinary bladder only.
- c. stomach only.
- d. intestine only.

0748. The strongest muscle in the body is present in the

a. thigh.

b. arm.

c. jaw.

d. neck.

0749. Myosin binds actin to form actomyosin mainly

a. in the presence of IMP.

b. in the presence of AMP.

c. in the presence of ADP.

d. in the presence of ATP.

0750. Magnesium ions are also essential for ATP-ase activity and

a. for relaxation of the muscle.

b. for the latent period of the muscle.

c. for contraction of the muscle.

d. for muscle fatigue also.

0751. The accumulation of lactic acid from glycogen break down is known as

a. gluconogenesis.

b. glycolysis.

c carbohydratogenesis.

d. glycogenesis.

0752. Tetanus is the muscular contraction due to

a. no stimulation.

b. repetitive stimulations.

c. only two stimulations.

d. latent period of the muscle.

Matching Type

0753. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Skeletal muscle	a. skeletal muscle.
B. Many nuclei in the single fibre	b. formation of cross bridges.
C. The actin and myosin	c. creatine phosphate.
D. High energy compound in the muscle	d. voluntary control.
E. Control of the skeletal muscles	e. prolonged contraction period.
F. the Smooth muscle	f. motor nerves.
G. Damage to motor nerve	g. paralysis of the muscle.
	h. cranial nerves
	i. dark and white muscles.

Short Answer Type

Write on the importance of the following.

0754. Muscle Contraction.

0755. Cross Bridges.

0756. Summation.

0757. Rigor Mortis.

0758. Muscle Spindles.

0759. Denervation Atrophy.

0760. Disuse Atrophy.

Essay Type

0761. Discuss the structural differences between the smooth, cardiac and skeletal muscles.

0762. List out briefly the different biochemical reactions during muscle contraction.

0763. Discuss the significance of actin, myosin and cross bridges during muscle contraction.

0764. What is the physiological significance of Cori's cycle.

0765. Point out the location of biceps, triceps, gastronemius, pectoralis and abdominal muscles.

0766. Discuss the significance of denervation atrophy, disuse atrophy and poliomyelitis.

Structured Type

0767. Draw and label the L.S. of skeletal muscle fibre.

0768. Draw and label the T.S. of skeletal muscle fibre.

0769. Draw and lebel the electron microscopic structure of myofibrils.

0770. Give the diagrammatic representation of sliding filament theory.

0771. Give a diagrammatic representation of the Cori's cycle in steps.

0772. Draw the dorsal view of the human body, and label the muscles.

0773. Draw and label contraction curve of a smooth muscle.

CHAPTER 8

Skeletal System

Completion Type

Fill in the blanks with suitable words.

0801. The system which comprises of different bones and provide protection to the body is known as......................................

0802. Generally, the endoskeleton is categorised into two types (i)........ and(ii)....................

0803. The axial skeleton mainly consists of (i)...........and(ii)...........

0804. The appendicular skeleton comprises of (i)...........and(ii)........

0805. The cells which form the bones are known as.......................

0806. Blood cells are usually produced in...................................

0807. The bones of children contain comparatively large quantities of organic substances but a small quantity of.........................

0808. The three regions of the cranium are (i) temporal (ii)............. and (iii).........................

0809. The eyes are situated in deep sockets called.........................

0810. Regional variations in the vertebral column can be recognised as (i)........(ii)...thoracic.....(iii)........(iv) sacral and (v) caudal.

0811. The last two pairs of ribs forming the sides of the chest cavity are called.........................

0812. The head of the humerus fits into the...........of pectoral girdle.

0813. The head of the femur articulates with the pelvic girdle in the region of..........................

0814. The major components of shoulder girdle of man are (i)........... (ii) scapula and (iii)................

0815 The major components of hip girdle are (i)...........(ii) ischium and (iii).......................

0816. The thoracic basket encloses and protects mainly the (i)........... and (ii)................

0817. In the wrist, there are small bones called the..........................

0818. The palm is made up of...........and each finger is supported by small.......................

0819. The lower leg (shank) in man is formed of...........and...........

0820. The brain case forms the anterior end of the...........skeletal system.

True-False Type

Write T if the statement is true, F if it is false.

0821. The bones of the forelimb are attached to the pelvic girdle.

0822. The thigh bones are always associated with the pelvic girdle.

0823. In the wrist, there are eight small bones called the tarsals.

0824. Tibia and fibula are the longest bones.

0825. Hinge joint is found in the ankle.

0826. The joints of the ankle are of angular type.

0827. Head of the femur usually articulates with the glenoid cavity present in the shoulder girdle.

0828. The axial skeleton comprises of the skull, vertebral column, sternum and ribs.

0829. The appendicular skeleton consists of the backbone and the breast bones.

0830. The ankle bones are usually known as metatarsal.

0831. Numerous openings of the foramina are present in brain case for the cranial nerves and blood vessels.

0832. Sternum articulates anteriorly with the shoulder girdle, and posterolaterally connects on either side with the ventral ends of thoracic ribs to form a complete enclosure of the chest region.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

0833. Each half of the lower jaw of man is made up of
- a. hyoid and cornua.
- b. dentary, condylar and angular.
- c. a single dentary.
- d. mandible.

0834. The humerus bone is present in the
- a. thigh.
- b. upper arm.
- c. lower arm.
- d. shank.

0835. The number of bones in human body is
- a. 306.
- b. 360.
- c. 206.
- d. 260.

0836. The number of vertebrae in *Homo sapiens* is
- a. 30.
- b. 31.
- c. 32.
- d. 33.

0837. The number of vertebrae in the neck region is
- a. 6.
- b. 7.
- c. 8.
- d. 9.

0838. The number of vertebrae in the thoracic regions in men is

a. 11.
b. 10.
c. 12.
d. 9.

0839. The number of carpals in wrist of man is

a. 9.
b. 7.
c. 8.
d. 10.

0840. How many pair of ribs form the sides of the chest cavity in human beings ?

a. 10
b. 12
c. 14
d. 24

0841. Which one of the following is the dominant skeletal material of the adult in most of the vertebrate groups ?

a. Cartilage
b. Bone
c. Scales
d. Feathers

Matching Type

0842. Match the different items of Column I to the appropriate items in Column II.

Column I	*Column II*
A. Manus	a. Foot
B. Pes	b. Pelvic girdle
C. Glenoid cavity	c. Hindlimb
D. Ilium	d. Pectoral girdle
E. Femur	e Hand
F. Ulna	f. Forelimb
G. Blood cells	g. Bone marrow
	h. Backbone

Short Answer Type

0843. Which part of the skeleton protects the brain ?

0844. Where are the glenoid cavity and acetabulum situated ?

0845. Name the regions of the vertebral column.

0846. What are floating ribs ?

0847. In human beings few ribs are attached to the sternum, few are attached to one another, few are floating. How is this arrangement useful to man ?

0848. In which part of the body angular joints are found ?

0849. How is a ball and socket joint formed ?

0850. What are the main regions of the skull ?

0851. How does dislocation of bones takes place ?

0852. Name any two bones in which the bone marrow is present.

0853. Why the are bones of a child more flexible and less brittle ?

0854. Name the longest bone of the human body.

Essay Type

0855. What is skeletal system and how is it useful to the body ?

0856. Describe the types of endoskeleton and write a note on appendicular skeleton.

0857. Discuss the utility of the skeletal system.

0858. Write a note on axial skeleton.

0859. Give the generalised structure of a vertebra.

0860. Write a detailed note on the various types of joints with suitable examples.

0861. How is hinge joint different from pivot joint ?

0862. How ball and socket joints differ from the pivot joints ? Explain it with suitable examples.

0863. How is fracture different from the dislocation of bones ?

Structured Type

0864. Draw a well labelled diagram of the pectoral girdle of man showing its three major components.

0865. Show the major parts of the pelvic girdle of man with the help of a well labelled diagram.

CHAPTER 9

ENDOCRINE SYSTEM

Completion Type

Fill in the blanks with suitable words.

0901. The hormones produced by testes are chemically .... in nature and are known as .... which are mainly secreted in the area of cells of Leydig.

0902. Biogenic amines are manufactured by the .... gland and the .... gland.

0903. The activities of various target glands like the thyroid, adrenal and gonads are regulated by the hormones secreted by the......... gland which in turn, are controlled by the ....

0904. Hormone secreted by the C-cells of the thyroid gland is known as ....which regulates the..............level of the blood.

0905. Simple goitre results from to the deficiency of substance........... which is normally a rich constituent of the hormone ....

0906. The ductless glands produce chemical substances which are secreted directly into the.................for their transport to the organs or tissues.

0907. The intermediate lobe of the so called master gland produces only one hormone called.................which controls pigmentation or colouration.

0908. Insulin regulates the amount of.................in the blood while glucagon is antagonistic to insulin in its action and helps to convert..............into glucose.

0909. The primary function of the ovary is to produce ova or oocytes where as secondary function is to produce..................

0910. All hormones work together to achieve metabolic hormones and are effective in maintaining normal..................

True-False Type

Write T if the statemant is true, F if it is false.

0911. The parathyroid hormones appear to be chiefly responsible for preserving a balanced equilibrium between calcium and phosphorus.

0912. Pineal gland found in the mid-brain area, is a vestigeal organ, that is, without any useful functions.

0913. Thyroxine is the only hormone secreted by the thyroid gland.

0914. Insulin regulates the amount of sugar in the blood while glucagon helps to increase the amount of blood sugar.

0915. Pituitary is considered as the chief gland of the endocrine system which is only responsible for governing the activities of other glands.

0916. Adrenocorticotrophic hormone (ACTH) is prodused in the area of adrenal cortex.

0917. The deficiency of thyroid stimulating homone (TSH) is the main cause for simple goitre.

0918. The secretions of adrenal gland are under the control of sympathetic nervous system.

0919. *Diabetes insipidus* is a disease caused due to the deficiency of hypoinsulinism.

0920. Tetany is due to the deficiency parathyroid hormone while tetanus is caused by a bacteria.

0921. Follicle stimulating hormone is usually secreted in the Graafiian follicles of the ovary.

Multiple Choice Type

Tick ($\surd$) mark the correct answer in each of the following cases.

0922. Which of the following hormone help in the ejection of milk from the female breast?

a. Prolacin
b. Oxytocin
c. Relaxin
d. Progesterone

0923. Which of the following substances is released in excess quantity during excitement?

a. Cortisone
b. Serotonin
c. Adrenalin
d. Nor-epinephrine

0924 Which of the following structures act as temporary ductless gland?

a. Pancreas
b. Pineal
c. Parathyroid
d. Placenta

0925. Which of the following secretory gland act both as endocrine and exocrine?

a. Adrenal
b. Parathyroid
c. Pancreas
d Pineal

0926. Which of the following substances provide a means of communication with other members of the same species?

a. Hormones
b. Pheromones
c. Catalysts
d. Sex hormones

0927. Vasopressin hormone secreted by posterior lobe of pituitary

a. raises blood pressure.
b. reduces blood pressure.
c. brings equilibrium in blood pressue.
d. has no action on blood pressure.

0928. The largest secretory gland in human body is

a. pancreas.
b. liver.
c. parathyroid.
d. adrenal.

0929. *Diabetes mellitus* can be controlled by the injections of

a. insulin.
b. glucagon.
c. streptomycin.
d. penicilin.

0930. The secretions of endocrine glands are called as

a. juices.
b. solutions.
c. hormones.
d. excretions.

0931 Which of the following is a hormonal disease ?

a. Measles.
b. Rabies.
c. Tuberculosis.
d. Osteitis fibrosa cystica.

0932. Islets of langerhans produce

a. insulin.
b. renin.
c. ptylin.
d. hydrochloric acid.

Matching Type

0933. Match the different items of column I to the approprite items in column II.

Column I	*Column II*
A. Thyroid	a. calcitonin
B. Corpus luteum	b. prolactin
C. Anterior lobe of pituitary	c. progesterone
D. Placenta	d. glucagon
E. Alpha cells of endocrine pancreas	e. human chorionic gonadotropins
	f. relaxin

Short Answer Type

0934. What are the hormones ?

0935. Point out the differences between a hormone and an enzyme.

0936. What is the chemical nature of hormones?

0937. Tabulate the various disorders associated with the hypo and hyper actvities of the thyroid gland.

0938. How is the calcium level maintained in the human body?

0939. Give a brief idea about hormone action.

0940. What are the effects of adrenalin?

Essay Type

0941. What are ductless glands and how these differ from ducted glands?

0942. Do you think that 'Pituitary gland' is a master gland Justify the statement.

0943. Name the various hormones secreted by the anterior lobe of the pituitary and describe the role played by these hormones.

0944. Which hormone controls the water and salt balance in the body?

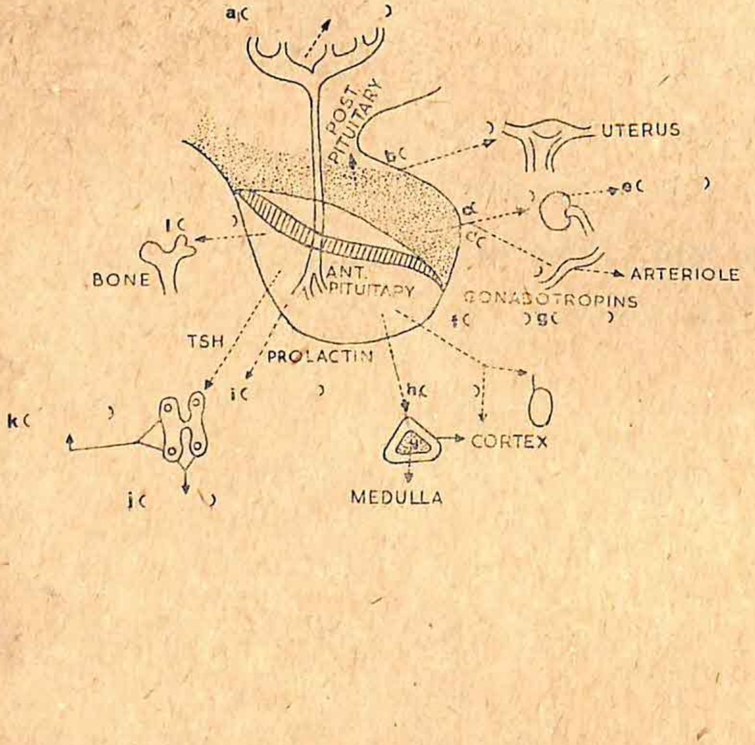
0945. What are the chemical coordinators ? Explain the role played by any one of them in controlling and coordinating the various activities.

0946. Is hypothalamus of any importance in the endocrine regulation? Explain it with the role played by releasing hormones factors.

0947. Explain the hormonal disorders in human body.

Structured Type

0948. With the help of the diagram given below fill up the appropriate terms in the parenthesis.



CHAPTER 10

Reproductive System

Completion Type

Fill in the blanks with suitable words.

1001. Reproductive organ of human being is the.............. in males and the .... in females.

1002. The funnel shaped opening of the fallopian tube is called the ....

1003. The two fallopian tubes (oviducts) open into a single ....

1004. The sperms first pass into the rete testis .... and then into the tubular region ....

1005. In man the two vasa deferentia open into the ....

1006. The urethra in human males is continued into the external genital organ ....

1007. The testis is made up of numerous ....

1008. The spermatogonia divide and give rise to .... which in turn give rise to..................

1009. The fusion of the egg and the sperm is called ....

1010. The egg cell and sperm fuse to form ....

1011. The well known and accepted method for improving the quality of cattle and other domesticated animals is called as................

1012. The children born by artificial insemination are called............

1013. The estrogen stimulates the growth of the uterine smooth mucsles the.................and the.................. .

1014. The menstrual cycle is repeated after every..................days and lasts for..................days.

1015. The artificial prevention of the implantation of fertilized ovum is done by.................. .

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1016. Reproduction in human beings takes place by
    a. vegetative reproduction.
    b. sexual reproduction.
    c. asexual reproduction.
    d. regeneration.

1017. The site of fertilization in human being is the
    a. fallopian tube.
    b. vagina.
    c. uterus.
    d. mesovarium.

1018. Which of the following is a female hormone?
    a. L.H
    b. Estrogen
    c. Glucagon
    d. Testosterone

1019. The testosteron hormone is produced by
    a. graafian follicle.
    b. lutein cells.
    c, leyding cells.
    d. corpus luteum.

1020. Tunica albugineae is the covering layer of
    a. ovaries.
    b. testis.
    c. ovum.
    d. uterus.

1021. Estrogen is secreted by

a. theca interna.

b. zona pellucida.

c. grrafian follicle.

d. corona radiata.

1022. Which of the following cells produce estrogen ?

a. Germinal epithelium

b. Cells of graafian follicle

c. Corpus albicans

d. Sertoli cells

1023. Spermatozoa are formed by the process of

a. fission.

b. mitotic division.

c. spermatogenesis.

d. oogenesis.

1024. The process by which the zygote gets attached to the uterine wall is known as

a. implantation.

b. insemination.

c. impregnation.

d. placentation.

1025. Cessation of menstrual cycle in the female is called

a. puberty.

b. maturation.

c. menopause.

d. ovulation.

1026. The operative control of fertility in male is known as

a. vasectomy.

b. microtomy.

c. tubectomy.

d. anatomy.

1027. The structure through which the foetus gets its nourishment and oxygen is

a. implantation.
b. placenta.
c. tunica albuginea.
d. vagina.

1028. The process of fertilization is external in

a. rabbit.
b. man.
c. pigeon.
d. frog.

1029. The placenta is found in

a. birds.
b. amphibians.
c. reptiles.
d. mammals.

1030. Which of the following hormones is produced by the testis ?

a. Estrogen
b. Insulin
c. Testosterone
d. Thyroxine

Analogy Type

Observe the relationship between the first two words and then fill in the suitable word at the fourth place.

1031. Testis : Mesorchium: : Ovary:.....................

1032. Testosterone : Testis : : Estrogen :.......................

1033. Vasectomy : Males : : Tubectomy : ....

1034. Leydig cells : Testosterone : : Graafian follicle cells:..............

1035. External fertilization : Frog : : Internal fertilization:............

1036. Ovary: Ovum:: Testis:.................

1037. Ovary : Oviduct : : Testis:..................

1038. Sperms : Spermatogenesis : : Ova:...................

Terminology Type

Supply the scientific terms for the following statements.

1039. When fertilization takes place inside the body.

1040. The connective tissue surrounding the ovary.

1041. The connective tissue covering the testis.

1042. Onset of menstruation at an age earlier than 13 years.

1043. The surgical fertility control in females.

1044. The arrest of the reproductive capacity in females.

1045. The surgical fertility control in males.

1046. The process of fusion of the ovum and the sperm.

1047. The process of attachment of fertilized egg to the uterine wall.

1048. The period of endometrial repairs.

Short Answer Type

1049. What do you understand by Precocious puberty ?

1050. What is umbelical cord ?

1051. Define the following terms :—

a. Fertilization
b. Ovulation
c. Artificial insemination
d. Menstruation
e. Placenta
f. Implantation

1052. What is the age of puberty in males and females ?

1053. Distinguish between the following:-
    a. Menstruation and Menopause
    b. Sperm and Ovum
    c. Tubectomy and Vasectomy
    d. Internal and External fertilization
    e. Umbelical cord and Placenta

Essay Type

1054. Describe with labelled diagram the structure of Graafian follicle.

1055. What do you understand by artificial insemination and what is its importance ?

1056. What is the necessity of fertility control ? What are the different ways of fertility control ?

1057. Explain in short some important changes that take place during menstrual cycle in non-pregnant female.

1058. Describe fully the ovarian cycle and give its importance ?

CHAPTER 11

Biological Rhythms

Completion Type

Fill in the blanks with suitable words.

1101. The rhythmic biological activities are called............

1102. The rhythms which are controlled from within the body are......

1103. Cirannual rhythms reflect the change of............

1104. A definite cycle of activity in relation to day light is called..........

1105. Bats are more active at night, hence they exhibit...........rhythms.

True-False Type

Write T if the statement is true, F if it is false.

1106. Endogenous rhythms are controlled by the changes in the seasons.

1107. Nocturnal and diurnal rhythms are in relation to 24 hour cycle of day and night.

1108. Biological clock is often regulated by the changes in seasons.

1109. Photoperiodism does not affect the endogenous rhythms.

1110. Eels and storks are not migratory animals.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1111. Biological rhythms are mainly classified into
    a. 6 types.
    b. 4 types.
    c. 5 types.
    d. 2 types.

1112. The environmental rhythms due to 24 hour cycle of day and night are called

a. migratory rhythms.
b. nocturnal and diurnal rhythms.
c. circadian rhythms.
d. cirannual rhythms.

1113. Eels belong to Pisces and starlings belong to Aves, still they are put together because they exhibit

a. endogenous rhythms.
b. diurnal rhythms.
c. migratory rhythms.
d. nocturnal rhythms.

1114. The endogenous rhythms are primarily controlled by

a. mutations.
b. variations in the climate.
c. variations in the levels of hormones, glucose, and lymphocytes in the blood.
d. variations in the food.

1115. The menstrual cycle in women is due to

a. cirannual rhythm.
b. exogenous rhythms.
c. the changes in the phases of moon and tides.
d. endogenous rhythms developed as a result of maturation.

Matching Type

1116. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Nocturnal	a. seasonal breeders
B. Endogenous rhythms	b. daylight
C. Cirannual	c. darkness
	d. variation in the levels of hormones, glucose and leucocytes.

Classification Type

1117. Which one of the following belong to a distinct class or category on the basis of biological rhythms.

a	b	c	d
Dog	Deer	Monkey	Man
Butterfly	Bumble bee	Cockroach	Honey-bee
Bat	Rabbit	House fly	Toad
Cockroach	Bee	Moth	Silk-moth

Analogy Type

Observe the relationship between the first two words, fill in the suitable word at the fourth place.

1121. Seasonal breeders : Cirannual : : Rats :............

1122. Darkness : Nocturnal : : Daylight :............

1123. Exogenous rhythms : Environment : : Endogenous rhythms:.........

1124. Biological rhythms : Circadian : : Seasonal rhythms :............

1125. Cockroach : Night : : Butterfly :............

Short Answer Type

1126. Define biological rhythm.

1127. Name five migratory animals.

1128. Give main points of differences between exogenous and endogenous rhythms.

1129. Define photoperiodism.

1130. Give one example where alteration of photoperiod has enhanced cirannual rhythms.

Essay Type

1131. "The periodicity of the biological rhythms is an inherited characteristic of animals." Throw some light on this statement.

1132. Are *Homo sapiens* seasonal breeders ? Discuss it.

1133. Explain cirannual rhythms.

1134, Why are biological rhythms referred to as biological clock ? Give examples.

1135. Ram went to Calcutta in December to spend his winter break. On his visit to the zoo he was fascinated by the sweet sound of whistling teals near the pond. He watched the bird for a long time and came home. During his summer break he visited the Calcutta zoo again in order to show the peculiar bird to his younger brothers and sisters, which he had seen in December. But he could not locate the teals.

Read the above para carefully and then answer the following question. What was the most likely cause of the disappearance of teals ?

a. Teals became extinct

b. Teals were taken to the other zoo in India

c. Teals are winter migratory birds

d. Teals are Indian birds

CHAPTER 12

Meristems

Completion Type

Fill in the blanks with suitable words.

1201. Tunica-corpus theory was proposed by...............

1202. Quiescent centre concept was proposed by...............

1203. The meristem located at the tip of shoot is known as...............

1204. The meristem located at the tip of the root is known as............

1205. Protoderm gives rise to...............

1206. A few cells occupying the central part of the distal region of the root apex is called.... ....

1207. The leaf primordium is formed by the flanks of............. meristem of the shoot.

1208. In plants the localised, perpetually dividing young group of cells are called...............

1209. Vascular cambium and cork cambium are examples of............. meristem.

1210. Cortex and vascular bundles are derived from...............

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases

1211. The root apex is subterminal because it
   - a. is covered by many layers of tunica.
   - b. has many cells of corpus.
   - c. is covered by root cap.
   - d. is covered by root hairs.

1212. Meristems have

a. thin walled, isodiametric, nucleate, richly protoplasmic cells.
b. thin walled, nucleate, isodiametric cells, less protoplasmic.
c. thick walled, less protoplasmic, isodiametric, nucleate cells.
d. thin walled, isodiametric, non-nucleate, richly protoplasmic cells.

1213. Apical initials and the immediate derivatives constitute

a. mass meristem.
b. promeristem.
c. protoderm.
d. lateral meristem.

1214. Cork cambium is a

a. lateral meristem.
b. intercalary meristem.
c. promeristem.
d. ground meristem.

1215. Primary vascular tissues are derived from

a. protoderm.
b. procambium.
c. ground meristem.
d. plate meristem.

Short Answer Type

1216. Mention the two charactersitics of quiescent centre.

1217. Which apex forms the flanks of leaf primordia ?

1218. Where does the initial anticlinal division occurs in the shoot apex ?

1219. In which part of the shoot apex both anticlinal and periclinal divisions occur ?

1220. The number of layers of tunica is always constant initially. What is the reason ?

1221. What is the usual shape of the short apex ?

1222. In what part is the intercalary meristem situated ?

Essay Type

1223. What do you mean by meristem ?

1224. Give four characteristics of the meristematic cells.

1225. Name three types of meristems classified on the basis of position.

1226. How reproductive apex is formed ? Give a brief account of its activity.

1227. Describe the organization and activity of the root apical meristem.

1228. What are the differences between stem apical and root apical meristem ?

1229. What is the quiescent centre ? Where is it located ?

1230. Differentiate the activity of the vegetative shoot apex and reproductive apex.

1231. Give the organization of the vegetative shoot apex.

1232. Write a short note on Tunica carpus theory.

1233. Write a short note on quiescent centre.

1234. Describe the formation of vascular bundles.

Other Type

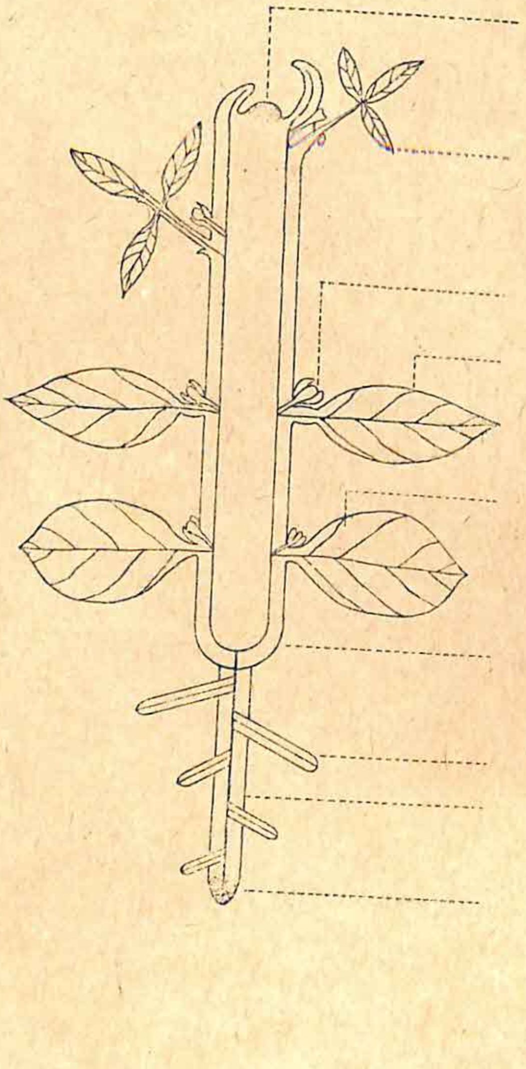
1235. Draw a labelled diagram of the L.S. of shoot apex.

1236. Draw a labelled diagram of the L.S. of root apex.

1237. Draw a labelled diagram of vegetative shoot apex to show the regions of activity.

1238. Draw a labelled sketch of stages of conversion of vegetative apex to reproductive apex.

1239. Label the parts indicated in the given diagram.



CHAPTER 13

Water Relations of Plant Cells

Completion Type

Fill in the blanks with suitable words.

1301. The value of the water potential of pure water at normal temperature and pressure is............

1302. In the thermodynamic terminology the osmotic pressure is equivalent to...........potential in concept but opposite in the sign of its value.

1303. The pressure exerted by the cell wall to balance the turgor pressure is called............

1304. If a cell is placed in a solution of higher solute concentration than that inside its vacuole water moves...........the cell.

1305. The concentrations of the cell sap...........is a plasmolysed cell.

True-False Type

Write T if the statement is true, F if it is false.

1306. Water serves as a medium for the transport of inorganic salts and food materials in the vascular system.

1307. Water molecules move freely across a selectively permeable membrane.

1308. The directions of the osmotic movement of water completely depends upon the number of solvent and solute molecules in the two sides of a selectively permeable membrane.

1309. The movement of water occurs from a cell with lower DPD to that with higher DPD.

1310. If a plant cell is put in a hypertonic solution, water starts moving out of it causing shrinkage in the cell volume.

1311. All other conditions remaining the same water molecules will diffuse from higher pressure to lower pressure side.

1312. The flow of water molecules always occurs from the cell with lower water potential to that with higher water potential.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1313. The form and structure of the growing cells are maintained because of the
   a. plasmolysis.
   b. turgidity.
   c. wall pressure.
   d. atmospheric pressure.

1314. In the osmotic system of a vacuolated cell, the plasmalemma together with the cytoplasmic film and the vacuolar membrane constitutes the
   a permeable membrane.
   b. selectively impermeable memberane.
   c. impermeable memberane.
   d. unit membrane.

1315. The vacuolar membrane is called the
   a. cell membrane.
   b. plasmalemma.
   c. tonoplast.
   d. chromoplast.

1316. The membrane which allows certain molecules to enter into the cell and prevents others is called the
   a. permeable membrane.
   b. selectively permeable membrane.
   c. impermeable membrane.
   d. unit membrane.

1317. The diffusion of the water molecules across a selectively permeable membrane is referred to as

a. diffusion.
b. osmosis.
c. plasmolysis.
d. incipient plasmolysis.

1318. The net movement of water through a semipermeable membrane results in the development of a hydrostatic pressure known as

a. turgor pressure.
b. wall pressure.
c. osmotic pressure.
d. low pressure.

1319. The entry of water into a cell as a result of osmosis causes a hydrostatic pressure to develop which pushes the cell wall. This is called

a. turgor pressure.
b. wall pressure.
c. osmotic pressure.
d. low pressure.

1320. If there is no net movement of water into a cell from the outside medium, the medium is considered as

a. isotonic to the cell sap.
b. hypertonic
c. hypotonic.
d. non-ionic.

1321. The stage when plasmolysis just begins and the plasmalemma starts receding from the cell walls is known as

a. plasmolysis.
b. incipient plasmolysis.
c. deplasmolysis.
d. diffusion.

Short Answer Type

1322. Name the three factors controlling the osmotic movement of the molecules in the two solutions of different concentrations separated by a selectively permeable membrane.

1323. Mention the osmotic relationship of a plant cell when it is put in
   a. a hypertonic solution.
   b. a hypotonic solution.
   c. an isotonic solution.

1324. How can the turgidity of a cell at incipient plasmolysis be required ?

1325. Do the solvent molecules move from the region of its lower concentration to that of higher concentration if separated by a selectively permeable membrane ?

1326. Define the terms OP, TP and DPD. Which one of them is directly responsible for the intake of water in plants ?

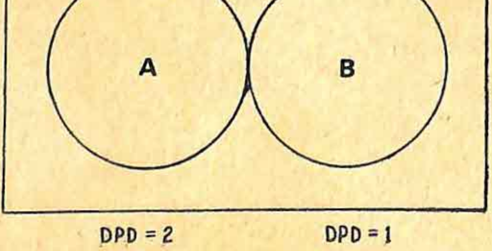
1327. In terms of DPD the movement of water in the cells takes place from the lower to higher valves. Is it so in terms of water potential also ?

1328. Differntiate between the following
   a. Exosmosis and Endosmosis.
   b: Plasmolysis and Deplasmolysis.

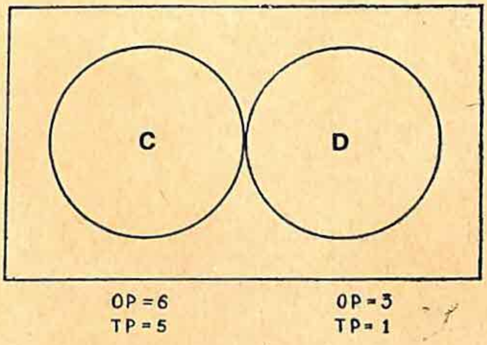
1329. Why is the cell called an osmotic syste m ?

Structured Type

1330. Indicate by an arrow the direction of movement of water in the cells A and B with their DPD values being 2 and 1 respectively.



1331. Indicate by an arrow the direction of movement of water in the two cells C and D. where C has OP=6, TP=5 and D has OP=3, TP=1.



CHAPTER 14

Root Structure and Function

Completion Type

Fill in the blanks with suitable words.

1401. The root structure bears close relationship to its function like ....of water.

1402. The cell layer located at the periphery in the cross section of the root is called...............

1403. The root...............are outgrowth of epidermis.

1404. The Casparian strip is not found in endodermal..............cells.

1405. Endodermis is the innermost layer of the...............

1406. There are two important components of the vascular tissue in plants..............and...............

1407. The xylem seen towards the centre of a root is called...............

1408. The centrifugal arrangement of the xylem vessels is called..........

1409. The first formed xylem in the root is known as...............

1410. In the monocot root the xylem is of the..............type.

1411. Root hairs principally perform the function of...............

1412. ....energy of the cell is utilised in active absorption of water in roots.

1413. Unlike the dicots the monocot roots do not exhibit.........growth.

1414. The division in the cells of cork cambium results in the formation of..............towards the outside and..............towards the inside.

True-False Type

Write T if the statement is true, F if it is false.

1415. The passage cells are those which have the casparian strip in them.

1416. The roots have xylem of the exarch type.

1417. The tetrarch type xylem is found in the dicot roots.

1418. Amongst the functions of the root the absorption of water and mineral nutrients, is an important one.

1419. In the dicot roots the cambium development precedes the secondary growth.

1420. The secondary growth gives rise to the primary xylem.

1421. The secondary vascular tissue arises as a result of the cell division in cork cambium.

1422. The cambium in roots is of the secondary origin.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1423. The movement of water from one cell of the cortex to the adjacent cells in root takes place due to the
   a. water potential gradient.
   b. accumulation of inorganic salts in cells.
   c. accumulation of organic compounds in cells.
   d. chemical potential gradient.

1424. The Casparian strip is present in the
   a. xylem.
   b. pericycle.
   c. pith.
   d. endodermis.

1425. Lateral roots arise from the
    a. epidermis.
    b. pericycle.
    c. endodermis.
    d. pith.

1426. The absorption of water in roots mainly takes place in the region of
    a. root epidermis.
    b. root hairs.
    c. xylem vessels.
    d. region of elongation.

Matching Type

1427. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Pericycle	a. phellogen
B. Passage cell	b. phellem
C. Tetrarch	c. dicot root
D. Root hair	d. monocot root
E. Large pith	e. formation of lateral root
F. Xylem strands less than six	f. four xylem strands
G. Cork	g. cambium
H. Cork cambium	h. absorption
I. Meristem	i. endodermis
	j. late formed

Analogy Type

Observe the relationship between the first two words and then fill in the suitable word at the fourth place.

1428. Cork cambium : Cork : : Cambium :...............

1429. Cambium : Secondary xylem : : Cork cambium :...............

1430. Root hairs : Water absorption : : Xylem vessels :...............

Short Answer Type

1431. What will happen if all the root hairs are removed from the root of a plant ?

1432. From the external appearance of the root system how will you distinguish between the dicot and monocot plants ?

1433. Which tissue is called endodermis ?

1434. What is meant by the Casparian strip ?

1435. What are the features of the passage cells ?

1436. Where is the pericycle located in the cross section of roots ?

1437. Mention two important functions of the pericycle.

1438. Which part of the root absorbs water from the soil ?

1439. What is meant by passive absorption of water ?

1440. What is meant by active absorption ?

1441. Which is the region of the root in which the cork cambium is initiated ?

1442. Which tissue differentiates cortex from the vascular region ?

1443. How xylem and phloem are organized in the root ?

Essay Type

1444. Describe the internal structure of a dicot root.

1445. What is endodermis ? Discuss its structure and functions.

1446. Describe the internal structure of a monocot root.

1447. List the differences between the root of monocot and dicot plants.

1448. Describe the process of absorption of water by roots.

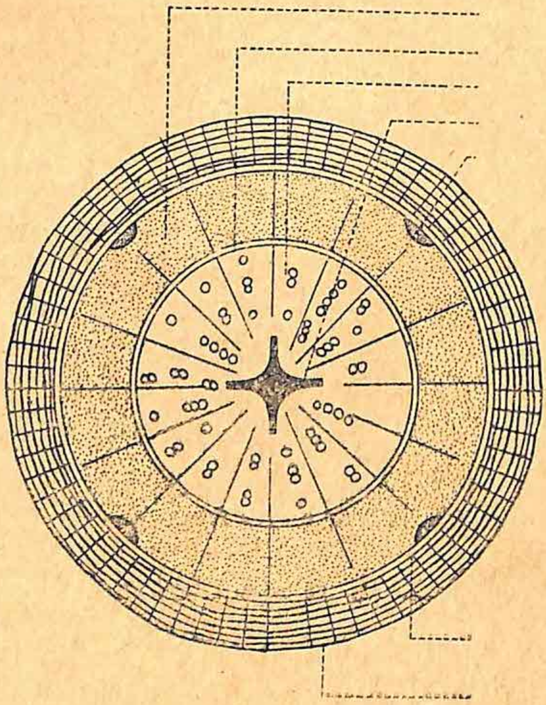
1449. Discuss how the absorption of mineral salts takes place in plants.

1450. Describe the process of secondary growth in dicot roots.

1451. Describe the formation and function of periderm in roots.

Other Types

1452. Label the parts indicated in the diagram given below.



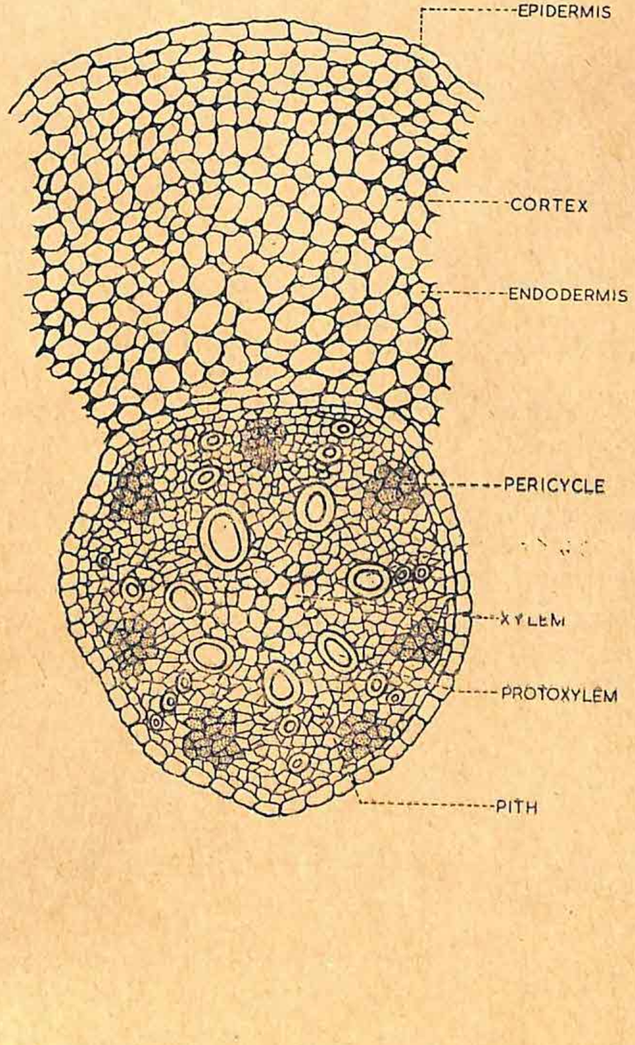
1453. With the help of a suitable diagram indicate the path of water movement from soil to xylem. Use arrows to show the direction.

1454. With the help of a labelled diagram describe an epidermal cell with root hair.

1455. Draw an enlarged view of the root showing different regions from the root cap to the absorbing zone having root hairs.

1456. With the help of a diagram bring out the structure of endodermal cells and position of the Casparian strip.

1457. Correct the labelling in the following diagram.



CHAPTER 15

The Inorganic Nutrition of Plants

Completion Type

Fill in the blanks with suitable words.

1501. Carbon and oxygen are available to the plant from the..............

1502. Carbon is absorbed by the plant as...............from the air.

1503. Manganese is a...............element required by the plant for its healthy growth and development.

1504. ....is involved in the conversion of oxalic acid into calcium oxalate in plant cells.

1505. The symptoms of Magnesium deficiency first appear in.............. leaves.

1506. The deficiency of Zinc...............the IAA content in plants.

1507. 'Little leaf' and 'Mottle leaf' conditions in the plants are caused by the deficiency of..............

1508. The deficiency of..............causes the death of the stem and root apices.

1509. The deficiency of.................reduces the absorption of carbon dioxide.

1510. The trace element constituent of the enzyme nitrate reductase is ....

True-False Type

Write T if the statement is true, F if it is false.

1511. All the mineral elements essential for the life of a land plant are obtained through the root system from the soil.

1512. For healthy growth and development the plants require Zinc and Copper in large quantities.

1523. The only criterion to determine essentiality of a mineral element is its requirement for the completion of the life cycle of a plant.

1514. Nitrogen is an important component of the protoplasm.

1515. Purines and pyrimidines are the nitrogenous compound of the genetic material, DNA.

1516. Chlorosis is a common symptom of nitrogen and sulphur deficiency.

1517. Excessive nitrogen increases the root system.

1518. There are certain amino acids which contain sulphur.

1519. Phophorous is not a constituent of NAD.

1520. Iron is important in the synthesis of chlorophyll.

1521. Magnesium and iron cause inter-veina chlorosis.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1522. Carbon is referred to as a macronutrient because
   a. of the relatively large quantities in which it is required.
   b. of its availability in abundance.
   c. of its easy detection.
   d. it is required in all the physiological processes.

1523. The micronutrients are the elements which are

a. required by the plants in large quantities.
b. required by the plants in trace quantities.
c. not at all required by the plants.
d. synthesised in the plants.

1524. Manganese is called a trace element because

a. it is required by the plant in relatively small quantities.
b. it is present in soil in small quantity.
c. it is required by the plants in relatively large qunatities.
d. it can be traced in the soil.

1525. Chlorosis is

a. the yellowing of leaves due to low content of chlorophyll.
b. the yellowing of the leaves due to the high content of chlorophyll.
c. the part of the petiole with low content of chlorophyll.
d. the character of a healthy plant.

1526. Chlorosis in nitorgen deficient plants appears

a. first in mature leaves and then in young leaves.
b. first in young leaves and then in mature leaves.
c. in the mature leaves only.
d. in the young leaves only.

1527. The excess of nitrogen supply to the plants produces

a. abundant leaves which are dark green.
b. less number of variegated leaves.
c. no leaves at all.
d. yellow leaves.

1528. Interveinal chlorosis is caused by the deficiency of

a. potassium.
b. phosphorous.
c. nitrogen.
d. magnesium.

1529. Synthesis of IAA requires
- a. zinc.
- b. iron.
- c. potassium.
- d. calcium.

1530. Exanthema, a disease of citrus plant is caused by the deficiency of
- a. copper.
- b. zinc.
- c. iron.
- d. magnesium.

Matching Type

1531. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Chlorosis	a. DNA
B. Arnon and Stout	b. nitrogen deficiency
C. Calcium pectinate of middle lamella of the cell.	c. cytochromes and Ferredoxin
D. Magnesium	d. defined the criteria for essentiality of mineral elements.
E. Electron transport process	e chlorophyll
F. Exanthema	f. deficiency of copper
	g. calcium

Short Answer Type

1532. Name any three substances in the plant in which phosphorus is a constituent.

1533. What is the chief symptom of a nitrogen deficient plant ?

1534. Where does the phosphorus deficiency symptoms first appear in the plant ?

1535. Is there a role for potassium in the synthesis of proteins ?

1536. Name the trace element which increases the absorption of water and calcium.

1537. What is the name of the disease of citrus caused by the deficiency of copper.

1538. Name any five macronutrients.

1539. Name any five micronutrients.

1540. What do the following stand for ?

a. ATP b. NAD c. NADP

Essay Type

1541. Define the criteria for essentiality of elements.

1542. What are macronutrients ? Discuss the symptoms caused by the deficiency of these nutrients.

1543. What are micronutrients ? Discuss their role in the growth of plants.

CHAPTER 16

The Stem

Completion Type

Fill in the blanks with suitable words.

1601. The outer most layer of cells in the cross section of a stem is called..............

1602. The growth of plant due to the activity of the apical meristems is called the..............growth.

1603. Collenchyma cells have..............walls only at the junctions of more than one cells.

1604. The outer layer of stem is covered by the substance named.........

1605. The region between the epidermis and the pericycle in a stem is called...........

1606. One of the functions of the parenchyma of cortex is the......... food materials.

1607. The active vascular cambium exhibits two types of cell division, additive and...........

1608. The periderm is the collective name for the cork, cork cambium and ....

1609. The secondary growth takes place in the dicots and gymnosperms but is absent in most of the.........

1610. In a young dicot stem, the vascular bundles are arranged in the form of a.........

True-False Type

Write T if the statement is true, F if it is false.

1611. The vascular bundles are not arranged in a ring in a young dicot stem.

1612. The fascicular and interfascicular cambium forms a continuous cylinder of the vascular cambium.

1613. Additive division involves periclinal divisions.

1614. In a dicot stem the xylem is exarch.

1615. The xylem is endarch in stems.

1616. The vascular bundles are not surrounded by a sheath of fibres in a dicot stem.

1617. The vascular bundles are not open in dicot stem.

1618. The secondary growth usually occurs in old stem of monocot.

1619. Medullary rays are not seen in dicot stem.

1620. Hypodermis consists of sclerenchyma in a monocot stem.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1621. Vascular bundles are arranged in a ring in
  a. dicot stem.
  b. dicot root.
  c. monocot stem.
  d. monocot leaf.

1622. Medullary rays are seen in
  a. dicot root.
  b. monocot root.
  c. monocot stem.
  d. dicot stem.

1623. Vascular bundles have a prominent sheath of fibres in
   a. dicot stem.
   b. monocot stem.
   c dicot root.
   d. monocot root.

1624. The stem increases in diameter due to the activites of
   a. shoot apical meristem.
   b. intercalary meristem.
   c. lateral meristem.
   d. root apical meristem.

1625. The secondary growth of stem results in
   a. increase in diameter.
   b. increase in length.
   c. production of vegetative appendages.
   d. production of floral appendages.

1626. Periderm is
   a. cork.
   b. cork cambium.
   c. phelloderm.
   d. cork, cork cambium and phelloderm.

1627. The vascular bundles in dicot stem are
   a. collateral and closed.
   b. radial and closed.
   c. collateral and open.
   d. bicollateral and closed.

1628. The vascular bundles of cucurbita are
   a. collateral and closed.
   b. bicollateral and open.
   c. bicollateral and open.
   d. collarteral and open.

1629. The number of cambial strands in vascular bundle of cucurbita is
   a. two.
   b. three.
   c. one.
   d. four.

1630. The hypodermis of monocot stem consists of
   a. parenchyma.
   b. chlorenchyma.
   c. sclerenchyma.
   d. collenchyma.

1631. The hypodermis of the dicot stem consists of
   a. parenchyma.
   b. chlorenchyma.
   c. collenchyma.
   d. sclerenchyma.

1632. The shape of scleroid cell is
   a. rectangular.
   b. elongated with tapering ends.
   c. elongated with blunt ends.
   d. short and oblong.

1633. Collenchyma cells have
   a. thick non-liginified walls.
   b. thick lignified walls.
   c. thick cutinised walls.
   d. thin cutinised walls.

1634. One of the functions of aerial stem is
   a. fixation.
   b. absorption of water.
   c. absorption of water and minerals.
   d. conduction of water and minerals.

Matching Type

1635. Match the different items of colum I to the appropriate items in column II.

Column I	Column II
A. lenticel	a. fibre
B. additive divison	b. phloem
C. multiplicative division	c. xylem
D. increase in diameter	d. periderm
E. scattered vascular bundle	e. vascular bundle in ring
F. dicot stem	f. periclinal division
G. tracheids	g. secondary growth
H. companion cells	h. anticlinal division
I. sclerenchyma	i. monocot stem
	j. collenchyma

Analogy Type

Observe the relationship between first two words and then fill in the suitable word at the fourth place.

1636. Dicot stem : Open vascular bundle : : Monocot stem :...........

1637. Additive : Periclinal division : : Multiplicative :...........

1638. Parenchyma : Living : : Sclerenchyma :...........

1639. Periderm : Protective : : Phloem :...........

1640. Lignified : Sclerenchyma : : Cutinised :...........

1641. Multicellular hairs : Stem : : Unicellular hairs :...........

Short Answer Type

1642. Name the meristem which produces phelloderm.

1643. What do you mean by tissue ?

1644. Name the dead tissues found in the stem.

1645. Mention two functions of epidermis.

1646. Give the names of two types of sclerenchyma.

1647. How vascular bundles are arranged in dicot stem ?

1648. What are the products of cambial ring ?

1649. Give the place of formation of interfascicular cambium.

1550. Give one function of lenticels.

1651. Name the outer boundary of the vascular system.

1652. Where are xylem and phloem present in collateral vascular bundle?

1653. What do you mean by open and closed vascular bundles ?

1654. What is the name given to collection of tissues formed in cortical region during secondary growth ?

1655. How protoxylem lacunae are formed in monocot stem ?

1656. Name the two lateral meristems which participate in secondary growth of dicot stem.

1657. Give a brief account of development of cambium in a dicot stem.

1658. What is the position of hypodermis in a stem ?

1659. What is the arrangement of xylem, phloem and cambium in a bicollateral vascular bundle ?

1660. What is the difference between stem and root from the stand point of vascular differentiation ?

Essay Type

1661. Describe the primary strucuture of a dicot stem.

1662. Describe the structure of vascular bundle found in cucurbita stem.

1663. Write down the primary structure of a monocot stem.

1664. Write down the functions of the tissues present in primary plant body.

1665. What are the main differences between the dicot and monocot stem ?

1666. Compare the anatomical features of a stem and root.

1667. Describe the process of secondary growth in dicot stem.

1668. What is meant by secondary growth in dicot stem ? How are the meristems responsible for the secondary growth in dicot plants ?

1669. Describe the role of cork cambium in the secondary growth.

1670. Bring out the structural differences between parenchyma and collenchyma.

1671. What is the structural difference between fibres and sclereids.

Other Types

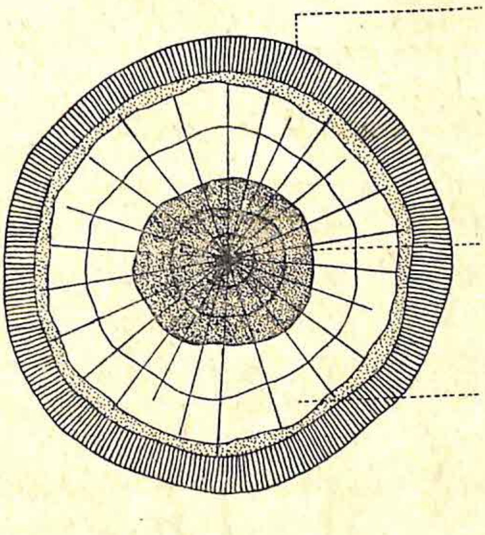
1672. With the help of a labelled diagram bring out the differences between collenchyma and sclerenchyma as seen in a transverse section.

1673. Draw a portion of longitudal section of a young dicot stem and label the parts.

1674. Draw a labelled diagram of vascular bundle of monocot (Maize) stem as seen under high power of microscope.

1675. Writh the help of labelled diagram show the formation of periderm.

1676. Label the parts indicated in the diagram given below.



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1666. Compare the anatomical features of a stem and root.

1667. Describe the process of secondary growth in dicot stem.

1668. What is meant by secondary growth in dicot stem ? How are the meristems responsible for the secondary growth in dicot plants ?

1669. Describe the role of cork cambium in the secondary growth.

1670. Bring out the structural differences between parenchyma and collenchyma.

1671. What is the structural difference between fibres and sclereids.

Other Types

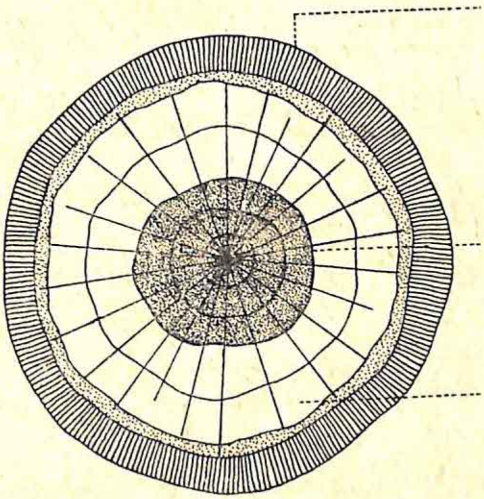
1672. With the help of a labelled diagram bring out the differences between collenchyma and sclerenchyma as seen in a transverse section.

1673. Draw a portion of longitudal section of a young dicot stem and label the parts.

1674. Draw a labelled diagram of vascular bundle of monocot (Maize) stem as seen under high power of microscope.

1675. Writh the help of labelled diagram show the formation of periderm.

1676. Label the parts indicated in the diagram given below.



CHAPTER 17

Forms and Functions of the Conducting Tissue.

Completion Type

Fill in the blanks with suitable words.

1701. The..................and pholem are the conducting tissues and constitute the..............system of plants.

1702. Xylem is a.......................tissue consisting of different types of cells.

1703. The two types of tracheary elements are..............in the xylem.

1704. If the perforation plate in the vessel has single perforation it is known as.................perforation plate.

1705. In the ontogentically most advanced tracheary element, the thickening in the secondary wall is of...........type.

1706. Tho secondary xylem is charecterised by the possession of two systems which are axial system and...................................... system.

1707. Each growth ring consists of an inner early wood and an outer.......................

1708 The principal function of the phloem is the conduction of the ....in plants.

1709. Companion cells are one of the constituents of................. elements.

1710. The wall of the sieve elements which bears the highly specialised sieve area is known as....................

1711. There are no rays in the...........xylem.

1712. The fully developed tracheary elements are elongated having...............secondary walls.

1713. The secondary xylem develops from the..............during the secondary growth of the plants.

1714. The axial system of the secondary xylem consists of...........fibres and parenchyma cells.

1715. ....is a process in which the bulk of the water that is taken up by the plant is lost.

1716. Reduction in the water content increases the..............potential of the mesophyll cells.

True-False Type

Write T if the statement is true, F if it is false.

1717. The xylem is a complex tissue consisting of the same type of cells.

1718. The parenchyma of the primary xylem is not organised into the axial parenchyma and the ray parenchyma.

1719. Based on the development difference the primary xylem is only of one type.

1720. The early wood and the late wood do not differ in the arrangement and size of the cells.

1721. The cells of the early wood are larger and have thinner walls than the cells composing the late wood.

1722. The primary phloem contains distinct rays.

1723. The presence of companion cells is a characteristic feature of angiospermic phloem.

1724. In the sieve cells sieve areas are well organised into sieve plates.

1725. The activity of the vascular cambium is periodic in the temperate regions.

1726. Xylem sap does not contain any mineral elements.

1727. Starch grains are formed in plastids which are terminal choromoplasts.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1728. In the first formed primary xylem the secondary wall thickening may be of
   a. reticulate type.
   b. annular or helical type.
   c. pitted type.
   d. scalariform type.

1729. The fully developed tracheary elements are
   a. elongated having lignified secondary walls.
   b. highly suberized.
   c. having dense cytoplasm.
   d. with distinct mucle.

1730. Each annual growth ring has
   a. an inner layer and an outer layer.
   b. a single layer of xylem elements.
   c. uniform layer of xylem elements.
   d. many layers of xylem elements.

1731. The xylem fibers are classified into
   a. protoxylem and metaxylem.
   b. primary and secondary fibres.
   c. fibre tracheids and fibres.
   d. long and short fibres.

1732. The end wall of the sieve element having cluster of pores is known as
   a. sieve zone.
   b. sieve membrane.
   c. sieve plate.
   d sieve layer.

1733. The conducting tissue associated with the transport of water and minerals is
   a. xylem.
   b. collenchyma.
   c. cambium.
   d. parenchyma.

1734. The tissue responsible for transport of organic nutrients from the source is
- a. xylem.
- b. ray parenchyma.
- c. phloem.
- d. parenchyma.

1735. A plant absorbs water first
- a. through the the roots.
- b. through the leaves.
- c. through the apical meristem.
- d. through the stem.

1736. The cohesion theory was advocated by
- a. J. C. Bose.
- b. Dixon and Joly.
- c. Marchello Malphigi.
- d. Münch.

Matching Type

Match the different items of column I to the appropriate items in column II.

	Column I	Column II
1737.	A. Tracheary elements	a. annual ring
	B. End walls of the vessels	b. sap wood
	C. Later formed xylem	c. thickening material of secondary wall layer
	D. Ray initials	d. organic nutrient
	E. Early and late wood	e. metaxylem
	F. Lignin	f. perforation plate
		g. xylem
1738.	A. J. C. Bose	a. Münch
	B. Dixon and Joly	b. storage organ
	C. Mass flow hypothesis	c. vital theory for ascent of sap
	D. Rhizome	d. organic nutrient
	E. Phloem	e. transipration pull theory
		f. xylem
		g. cambium

Analogy Type

Observe the relationship between the first two words and then fill in the suitable word at the fourth place.

1739. Heart wood : Non functional xylem : : Sapwood :..............

1740. Pitted elements : Phloem : : Fusiform initials :.........................

1741. Parenchyma : Simple tissue : : Phloem :..........................

1742. Primary xylem : Secondary xylem : : Primary phloem :..............

Short Answer Type

1743. What are living and non living types of cells which form the xylem ?

1744. Mention the types of tracheary elements in the primary xylem ?

1745. What is the difference between a tracheid and a vessel member ?

1746. What are the types of secondary wall thickening in the first formed primary xylem ?

1747. What is the difference between an exarch and endarch vascular bundles with respect to metaxylem ?

1748. Name the two types of xylem fibres.

1749. Mention the types of the wood found in an annual ring.

1750. List two theories for explaining the mechanism of ascent of sap.

1751. Give the major functions of the phloem.

1752. Name the type of cells found in the secondary phloem elements.

1753. Name the two types of sieve elements.

1754. What does the term source indicates ?

1755. What does the cytoplasmic streaming hypothesis state ?

1756. Name one storage organ in plants.

1757. Do the mature sieve elements show cytoplasmic streaming ?

Essay Type

1758. Describe the various types of secondary wall thickenings in the xylem.

1759. Distinguish between the primary and the secondary xylem.

1760. What are the different cell types that occur in the phloem ? Mention their functions.

1761. Distinguish between the primary and the secondary phloem.

1762. What is the root pressure ? How will you demonstrate the root pressure ?

1763. Discuss the theory advocated by Dixon and Joly.

1764. Explain the mass flow hypothesis.

Structured Type

1765. Draw a labelled diagram of a part of longitudinal section of a primary vascular bundle showing the secondary wall structure in its tracheary elements.

1766. Draw a labelled diagram of the elements that occur in the secondary xylem.

1767. Draw a labelled diagram of the elements of the phloem as seen in longitudinal section.

1768. Give a diagrammatic representation of the mass flow hypothesis.

CHAPTER 18

Leaf—Structure and Functions

Competion Type

Fill in the blanks with suitable words.

1801. The principle of limiting factor was proposed by...............

1802. The sequence of dark reaction of photosynshesis was discovered by..............

1803. The enzyme necessary for the Hatch and Slack Cycle is called ....carboxylase.

1804. The light reaction is performed in the..............of chloroplast.

1805. Phosphorylation in the electron transfer chain takes place in the ....reaction.

1806. Photolysis of water takes place in the..............reaction.

1807. $NADPH_2$ is formed from NADP and hydrogen needed for the reaction comes from...............

1808. $NADPH_2$ and ATP formed in light reaction are used in the............... reaction.

1809. The rate of transpiration can be measured by the..............

1810. Differential transpiration is demonstrated by the..............paper method.

1811. Transpiration is..............proportional to humidity.

1812. Guttation occurs through the pores called..............

True-False Type

Write T if the statement is true, F if it is false.

1813. Ferredoxin is the most electro-negative compound in the living cell.

1814. The electron of chlorophyll molecule expelled out by light is compensated by one derived from the photolysis of water.

1815. Chlorophyll a is the only pigment capable of absorbing light in photosynthesis.

1816. The light energy absorbed by pigments other than cholorophyll@ is lost in the process of photosynthesis.

1817. The absorption spectrum of chlorophyll@ has a peak in the red region only.

1818. The action spectrum of photosynthesis broadly corresponds with the absorption spectra of the chlorophylls.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1819. Which one of the following reactions is more appropriate for photosynthesis?

a. $C_6H_{12}O_6 + 60_2 + 6H_2O \longrightarrow 6C0_2 + 12H_20$.
b. $C0_2 + H0 \longrightarrow HCHO + O_2$.
c. $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 60_2$.
d. $6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 60_2 + 6H_2O$.

1820. Photophosphorylation occurs

a. during day time.
b. at night.
c. during both day and night.
d. in cloudy days only.

1821. The electron lost by P_{700} in the light reaction returns back from

a. NADP.
b. $NADPH_2$.
c. ATP.
d. P_{680}.

1822. The electron ejected by P_{680} in the light reaction is initially accepted by

a. plastoquinone.
b. ATP.
c. ferredoxin.
d. P_{700}.

1823. The trap centre of energy in phytosystem I is

a. Chl.@.
b. Carotene.
c. P_{700}.
d. P_{680}.

1824. The trap centre of energy in Photosystem II is

a. P_{680}
b. carotene.
c. P_{700}.
d. xanthophyll.

1825. In the C_4 plants CO_2 is initially fixed with

a. ribulose diphosphate.
b. acetyl CoA.
c. vitamin K.
d. phosphenol pyruvate.

1826. In C_3 plants CO_2 is initialiy fixed with

a. ribulose diphosphate.
b. phosphoenol pyruvate.
c. oxaloacetic acid.
d. citric acid.

1827. Spraying of phenyl mercuric acetate (PMA)

a. accelerates transpiration.
b, reduces transpiration.
c. increases the rate of photosynthesis.
d. causes guttation.

1828. Stomata are normally present

a. only on upper epidermis.
b. only on lower epidermis.
c. on both upper and lower epidermis.
d. on some green parts of stem only.

1829. The number of stomata in a dorsiventral leaf is generally
   a. greater on upper than on lower epidermis.
   b. greater on lower than on upper epidermis.
   c. same on both the sides.
   d. nil on both the sides.

1830. The mesophyll cells are
   a. parenchymatous.
   b. collenchymatous.
   c. sclerenchymatous.
   d. meristematic.

1831. Spongy parenchymatous cells are
   a. packed in two rows.
   b. loosely arranged.
   c. packed in one row.
   d. packed in many rows.

1832. A leaf vascular bundle consists of
   a. only xylem components.
   b. only phloem components.
   c. both xylem and phloem components.
   d. both xylem and phloem components along with cambium.

1833. The research about the mechanism of photosynthesis started
   a. around 500 years ago.
   b. in the eighteenth century.
   c. after 1950.
   d. in the early twentieth century.

1834. The oxygen evolved in photosynthesis comes from water was shown by using the isotope of
   a. hydrogen in water.
   b. oxygen in water.
   c. carbon in carbon dioxide.
   d. oxygen in carbon dioxide.

1835. The Chloroplasts are of the size range of
   a. a few microns.
   b. a few millimicrons.
   c. a few Angstron units.
   d. tenths ef millimetre.

1836. Thylakoids of grana have the
    a. enzymes for the C-3 pathway.
    b. enzymes for the C-4 pathway.
    c. enzymes for the light reactions.
    d. enzymes for pentose phosphate pathway.

1837. Ribulose disphosphate is the first compound to bind the CO_2 in
    a. pentose phosphate pathway.
    b. C-3 cycle.
    c. C-4 cycle.
    d. citric acid cycle.

Short Answer Type

1838. Name four external factors which influence the process of photosynthesis.

1839. Who proposed the principle of limiting factor ?

1840. Give two examples of (i) C_3 Plants and (ii) C_4 Plants.

1841. Give two examples of antitranspirants.

1842. What is the peculiar anatomical character of Kranz anatomy of leaf ?

1843. List three differences between C_3 and C_4 plants.

1844. What is the initial acceptor of carbon dioxide in C_3 and C_4 plants respectively.

1845. What is the special anatomical feature seen in the leaves of the C_4 plants ?

1846. Name the scientist who demonstrated that oxygen is released by the isolated chloroplast in the presence of sunlight and hydrogen acceptor substances.

1847. Name two hydrogen acceptors which Hill used in his experiments.

1848. Name the substances which could replace the non-physiological substances used by Hill.

1849. Name two products of Hill reaction.

1850. What does Hill's experiment prove ?

Essay Type

1851. What is the role of pH in mechanism of stomatal action as proposed by Sayre and Scarth ?

1852. Explain the theory proposed by Levitt in 1967 for the mechanism of opening and closing of stomata.

1853. Explain the external factors which influence the process of photosynthesis.

1854. How will you identify the T.S. of the following leaves ? Give distinctive features of each.
   a. Mesophytic dicot
   b. Monocot
   c. Xerophytic dicot

1855. Draw and describe the structure of the cell organelle which contains the entire machinery necessary for photosynthesis.

1856. Describe the mechanism of photochemical phase (light reaction).

1857. How is carbon dioxide fixed and reduced during photosynthesis?

1858. Describe the mechanism of biosynthetic phase (dark reaction).

1859. Describe the Hatch and Slack pathway.

1860. What are the functions of the chloroplast ?

1861. How was it proved that oxygen evolved during photosythesis comes from carbon dioxide ?

1862. Write down the structure and functions of hydathodes.

1863. What do you understand by C_3 and C_4 plants ?

1864. Transpiration is a significant process in plants. Comment.

1865. How does a leaf originates and develops ?

1866. Describe the organisational pattern of dicot mesophytic leaf.

1867. The submerged aquatic plants do perform photosynthesis but these do not have functional stomata on the surface of leaves and stem. Explain how do they perform gaseous exchange ?

1868. If all the green plants on the earth were not to depend on the light reaction for the supply of the reducing agent needed for CO_2 reduction how in your opinion, our environment will be affected? Explain giving reasons.

1869. 'If all the green plants on the earth are removed life can not be sustained on the earth'. Comment on the statement

1870. What will be the effect of repeated applications of some antitranspirants on crops ?

1871. Suppose all the external factors necessary for photosynthesis are available at optimal level but the temperature is as low as 2°C. How will it affect the rate of photosynthesis ?

1872. In an experiment for evolution of oxygen during photosynthesis, in a hydrophytic plant the following data is obtained at constant temperature and light intensity.

CO_2 in terms of % of $NAHCO_3$	*Number of oxygen bubbles evolved*
Nil	3
0.1	10
0.2	18
0.4	22
0.6	25
0.8	25
0.0	25

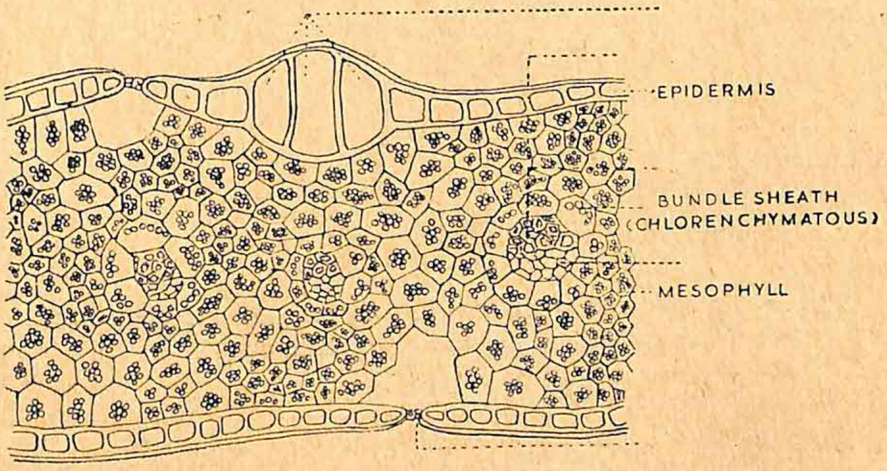
Plot the graph of the given data and provide your interpretation.

Other Types

1873. Draw a labelled diagram of the TS of mesophytic dicot leaf.

1874. Draw a labelled diagram of a dorsiventral xerophytic leaf.

1875. Label the parts indicated in the following diagram.



1876. Depict the different features in the morphology of stomata in monocot and dicot plants in a labelled diagram.

1877. Show the relationship of stoma and grana found in the chloroplast in a suitably labelled diagram.

1878. Draw a diagram of the structure of the leaf which performs guttation.

1879. Draw a labelled sketch of the apparatus devised by Ganong to compare the rate of transpiration, under different conditions, of a cut twig.

CHAPTER 19

Respiration

Completion Type

Fill in the blanks with suitable words.

1901. ∝-Ketoglutarate transforms into a 4-carbon molecule,.............. catalysed by the enzyme ∝-ketoglutarate dehydrogenase.

1902. Succinate dehydrogenase reduces..............to fumarate and the hydrogen liberated is accepted by FAD.

1903. The type of respiration in which oxygen is not utilised in the breakdown of carbohydrates to produce CO_2, ethyl alcohol or lactic acid is called.............. .

1904. 3-phosphoglycerate is converted into...........by the enzyme phosphoglyceromutase.

1905. 2-phosphoglycerate is converted into 2-phosphoenolpyruvate by the enzyme.............. .

1906. 2-phosphoenolpyruvate reacts with ADP to form ATP and through the mediacy of the enzyme pyruvatekinase.

1907. The enzyme diphosphoglyceratekinase catalyses the reaction of 1,3-diphosphoglycerate and ADP to form...........and..............

True-False Type

Write T if the statement is true, F if it is false.

1908. During the formation of ATP the energy is stored in the high energy bond.

1909. During the hydrolysis of ATP energy is released.

1910. The coenymes ($NADH_2$, $FADH_2$) are oxidised in a process called as electron transport.

1911. There is a net gain of only 2 molecules of ATP during glycolysis.

1912. ATP is called as the energy currency of the cell.

1913. The ratio between the amount of oxygen absorbed and CO_2 released is called a respiratory quotient.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

1914. In respiration.
   a. organic substances are oxidised.
   b. enzymes are synthesised.
   c. large amount of ATP is consumed.
   d. fats are never used as a substrates.

1915. In anaerobic respiration
   a. oxygen acts as the ultimate electron acceptor.
   b. ethyl alchol is the usual product.
   c. the series of steps leading to the formation of pyruvate are not similar to those of aerobic respiration.
   d. glycolysis is not involved.

1916. During glycolysis fructose 1,6-diphosphate splits into
   a. two molecules of pyruvic acid directly.
   b. the molecules of phosphoglyceraldehyde.
   c. 3-phosphoglyceraldehyde and dihydroxyacetone phosphate.
   d. two molceues of dihydroxyacetone phosphate.

1917. In glycolysis the net gain is two ATP molecules and
   a. two NAD.
   b. two $FADH_2$.
   c. two $NADH_2$.
   d. two FAD.

1918. The series of reactions in TCA cycle take place in

a. ribosome.
b. grana.
c. mitochondria.
d. endoplasmic reticulum.

1919. In the Krebs cycle acetate is activated by

a. aconitase.
b. malate dehydrogenase.
c. succinyl coenzyme A.
d. coenzyme A.

1920. In the TCA cycle the acid to react with acetyl coenzyme A is

a. fumeric acid.
b. succinic acid.
c. oxaloacetic acid.
d malic acid.

1921. Oxidative phosphorylation is the synthesis of

a. ADP during the aerobic respiration.
b. NADP during the anaerobic respiration.
c. ATP during the aerobic respiration.
d. phytochrome.

1922. In photorespiration the evolution of CO_2 from photosynthetic tissue is induced by the

a. light.
b. temperature.
c. high oxygen content.
d. low oxygen content.

1923. Glucose is converted into pyruvic acid through a series of reactions with net gain of

a. 2 molecules of ATP.
b. 36 molecules of ATP.
c. 4 molecules of ATP.
d. 38 molecules of ATP.

1924. The maximum rate of respiration in many plants of the tropics can be observed in the range of

a. 0°C-25°C.
b. 30°C-40°C.
c. 60°C-100°C.
d. above 100°C.

1925. RQ in the case of glucose is

a. 1.0 .
b. 1.5 .
c. 0.5 .
d 2.0 .

1926. In anaerobic respiration of plants one of the end products is

a. methyl alcohol.
b. pyruvic aeid.
c. ethyl alcohol.
d. malic acid.

1927. The reaction $C_6H_{12}O_6+90_2 \longrightarrow 6CO_2+6H+674$ Cals relates to

a. photosynthesis.
b. anaerobic respiration.
c. aerobic respiration.
d. photorespiration.

Short Answer Type

1928. What type of reaction is involved in the transformation of pyruvate to acetate.

1929. Define respiration.

1930. Name the three substrates utilised in plants for the release of energy.

1931. Name two components formed after the breakdown of a fructose 1,6-diphosphate. Also name the enzyme which catalyses the above reaction.

1932. What is the fate of dihydroxyacetone phosphate in glycolysis formed by the breakdown of fructose 1,6—diphosphate ?

1933. Write the full forms of NAD and $NADH_2$.

1934. State 3 points of differences between glycolysis and Krebs cycle.

1935. Name the main reasons why tomatoes remain fresh for a longer period when kept in a refrigerator but decay if kept in a cupboard.

1936. Name an enzyme which becomes inactive with the increase of oxygen concentration.

1937. Name different factors which affect the rate of respiration.

1938. Name 3 chemical substances which inhibit the rate of respiration.

1939. Name the organelle in which ATP is synthesised during respiration.

1940. Name the coenzyme which acts as hydrogen acceptor in the conversion of glucose-6-phosphate into 6-phospogluconate in pentose pathway.

1941. Define electron transport chain of respiration.

1942. Define oxidative phosphorylation.

1943. Which of the following is the usual respiratory substrate ? carbohydrates, vitamins, mineral salts.

Essay Type

1944. Define glycolysis and discuss its importance.

1945. Give a schematic outline of glycolysis.

1946. Discuss the details of the Krebs cycle.

1947. Describe the effect of temperature on respiration.

1948. Draw a schematic outline of aerobic respiration.

1949. Define respiratory quotient and state its significance.

1950. Explain in correct sequence the reactions of Warburg-Dickens cycle of monophosphate.

1951. What is an endergonic reaction ? Give one example.

1952. How is the study of respiration useful for the welfare of the mankind ?

1953. Explain the effect of temperature on the process of respiration.

1954. State the effects of oxygen concentration on the rate of respiration.

1955. State the effects of CO_2 concentration on respiration.

1956. State the effect of light on respiration.

1957. Define photorespiration. How does it differs from dark respiration ?

1958. Explain the electron transport reaction in the mitochondria.

1959. Explain the process of alcohlic fermentation.

1960. Explain the process of lactic acid fermentation.

CHAPTER 20

Plant Growth and Development

Completion Type

Fill in the blanks with suitable words.

2001. Growth can be defined as .... increase in weight, volume or size.

2002. The three components of growth in plants are cell ...., ..., and do ....

2003. In the series of developmental phases .... generally just precedes the death of the organism.

2004. In unicellular organisms cell .... results in increase in their population.

2005. The graph of growth rate against time is of .... type.

2006. Cell division resulting in plant growth is ....

2007. The cells of young stem axis mostly undergo .... instead of expansion in all directions.

2008. .... is the pigment which mediates several light induced developmental processes.

True-False Type

Write T if the statement is true, F if it is false.

2009. Photosynthetic pigments are the only light absorbing pigments in plants.

2010. Xylem, phloem and cortical cells differentiate from the cells of the root cap.

2011. Lettuce seeds fail to germinate if no exposure to light is available after they imbibe water.

2012. Light is essential to prevent etiolated growth of seedlings.

2013. Plant development is influenced only by the duration of light exposure.

2014. Critical length of dark period is associated with photoperiodic response of plants.

2015. Interruption of dark period with light exposure prevents flowering in short day plants.

2016. Interruption of dark period with light exposure prevents flowering in long day plants.

2017. The optimum temperature for plant growth is identical for all plant species.

2018. The cold temperature requirement for flowering is universal for all the plants.

2019. The characteristic of auxins is to bring about curvature growth in *Avena* coleoptile if placed laterally at the cut tip in darkness.

2020. The gibberellins and auxins are alike in inducing curvature in *Avena* coleoptile.

2021. All auxins are naturally occurring plant growth substances.

2022. Both IAA and GA are the metabolic products of fungi.

2023. IAA cannot induce the dwarf maize plants to elongate.

2024. Abscisic acid prevents leaf abscission in plants.

2025. Abscisic acid is associated with dormancy phenomena of seeds.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2026. The following of the plant growth substances is not a growth promoter.
   a. IAA
   b. GA
   c. Kinetin
   d. Abscisic acid

2027 The habit of the cabbage plant can be changed drastically by the application of
   a. IAA.
   b. GA.
   c. kinetin.
   d. abscisic acid.

2028. The synthesis of $\propto$-amylase in certain cereals is stimulated by
   a. IAA.
   b. GA.
   c. kinetin.
   d. abscisic acid.

2029. The curvature in *Avena* coleoptile is associated with the growth substance
   a. IAA.
   b. GA.
   c. Kinetin.
   d. Abscisic acid.

2030. The temperature range of plant growth is roughly between
   a. 0-50°C.
   b. 0-15°C.
   c. 0-35°C.
   d. 10-50°C.

2031. The correct chronological sequence of developmental stages in plant is
   a. flowering-fruiting-juvenility-germination.
   b. germination-juvenility-flowering-fruiting.
   c. juvenility-flowering-germinating-fruiting.
   d. fruiting-flowering-juvenility-germination.

2032. To be very accurate the long day plants have
- a. short night requirement for flowering.
- b. no night requirement for flowering.
- c. long night requirement for flowering.
- d. long day requirement for flowering.

2033. In the R-FR responses of plants it is the
- a. first treatment that counts.
- b. middle treatment that counts.
- c. last treatment that counts.
- d. sum total of all the treatments that counts.

2034. Etiolation best signifies
- a. slender green stems.
- b. slender-yellowish stem.
- c. compact-green stem.
- d. compact-yellowish stem.

2035. The red-far red (R-FR) responses are not independent of
- a. IAA.
- b. 2,4-D.
- c. GA.
- d. abscisic acid.

2036. The correct sequence of cellular growth stages is
- a. division-differentiation-elongation.
- b. divison-elongation-differentiation.
- c. differentiation-division-elongation.
- d. elongation-differentiation-division.

Matching Type

Match the different items of column I to the appropriate items in in column II.

2037.

Column I	Column II
A. IAA	a. tomato, cotton pea
B. GA	b. phytochrome
C. R-FR	c. leaf fall
D. Abscisic acid	d. polar transport
E. Day neutral plants	e. dwarf maize
	f. chlorophyll

Classification Type

Which one of the following belongs to a distinct class or category.

2038. a. Flowering, b. Fruiting, c. IAA, d. Dormancy

2039. a. IAA, b. GA, c. Kinetin, d. Phytochrome

2040. a Long day plants, b. Phytochrome, c. R-FR, d. Chlorophyll

Analogy Type

Observe the relationship between the first two words and then fill in the suitable word at the fourth place.

2041. IAA : *Avena* coleoptile : : GA : ....

2042. R-FR : Phytochrome : : Photosynthesis : ....

2043. IAA : Auxin : : GA : ....

2044. Went : Auxin : : Skoog : ....

Short Answer Type

2045. Name a non acidic growth substance.

2046. Name the growth substance that promotes senescence.

2047. Draw a graph to show the auxin responses of root and stem.

2048. Name the pigment Involved with flowering process in short day plants.

2049. What is the characteristic of the growth curve ?

2050. Name 3 long day, 3 short day and 3 dayneutral plants.

2051. State what environmental factors relate to photoperiodism and vernalization, respectively.

Essay Type

2052. Give an account of internal factors affecting plant growth.

2053. Give an account of role of light and temperature in plant growth.

2054. Explain with diagrams the photoperiodic responses of a short day plant with regard to the light interruption of the dark period.

2055. Describe the significance of cell division, cell elongation and cell differentiation in plant growth.

2056. Discuss the significance of phytochrome in regard to light responses of plants.

CHAPTER 21

Plant Movements

Completion Type

Fill in the blanks with suitable words.

2101. Many plants show no locomotion but only............................ movements.

2102. Nonliving plant tissuses or organs imbibe water thus causing...... movement.

2103. ....involves the spiral type of growth of the shoot apex.

2104. If the organ becomes oriented at right angles to the force of gravity it is called......................

2105. An example of diageotropism is....................

2106. An example of diaphototropism is....................

True-False Type

Write T if the statement is true, F if it is false.

2107. When the plant grows the shoot apex moves.

2108. Tropic movements like the nastic movements are directional in response to the external stimulus.

2109. Nastic movements are non-directional in response to the stimulus while tropic movements are directional.

2110. The folding of leaf in *Mimosa pudica* is due to irreversible changes in the turgidity of the mesophyll cells.

2111. The pulvinus is the site of turgor changes in *Mimosa pudica* in response to touch.

2112. The folding and rolling of grass leaves is an example of the nastic movement.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2113. The following is not an example of the growth movements in plants

a. bending towards light.
b. twisting of the stem around a stick.
c. opening of stomata in light.
d. displacement of the growing point in course of time.

2114. Tropic movements are basically due to

a. cell elongation.
b. sudden water loss.
c. sudden water gain.
d. cell division.

2115. If a seedling is artificially placed with its radicle pointing upwards

a. it will keep growing straight upwards.
b. it will maintain its position in horizontal plain parallel to the ground.
c. it will eventually bend so as to move towards the ground.
d. it will stop growth immediately.

2116. If an etiolated stem could be first saturated with auxin by spraying and then exposed to a streak of light from one side

a. it will bend towards the light.
b. it will bend away from the light.
c. it will grow straight upward.
d. it will be prevented from growing,

2117. Phototropism is due to an unequal distribution of auxin in stem in response to the direction of light that falls on it. The auxin moves

a. from the illuminated side to the dark side.
b. from the dark side to the illuminated side.
c. vertically downwards.
d. vertically upwards.

Analogy Type

Observe the relationship between the first two words and then filll in the suitable word at the fourth place.

2118. Cell division: Growth movement : : Water movement:............ .

2119. Irrereversible elongation : Growth movement : : Reversible cell elogation:..................... .

2120. Light : Phototroprism : : Gravity :...........

Short Answer Type

2121. Write a sentence each to describe

a. presentation time.
b. reaction time.
c. relaxation time.
d. fatigue.

2122. Give two examples each of the following in plants.

a. Growth movements.
b. Turgor movements.
c. Locomotory movements.

2123. In what way the stomatal movement can be regarded as turgor movement ?

Essay Type

2124. Give a brief account of phototropic and geotropic movement giving their kinds and mechanism.

2125. Describe the turgor movements of plants giving suitable examples.

2126. Provide a schematic classification of various types of movements in plants.

CHAPTER 22

Plant Rhythms

Completion Tppe

Fill in the blanks with suitable words.

2201. .... rhythms have a periodicity of about 24 hours.

2202. .... rhythms have a periodicity of about a year.

2203. The phases of the moon entrain the .... rhythms in plants.

2204. .... rhythms persist for a number of cycles before vanishing.

2205. The existence of rhythms indicates the presence of .... clocks in living organisms.

2206. The biological clock may be located in .... since endogenous rhythms are known to occur in unicellular organisms also.

True-False Type

Write T if the statement is true, F if it is false.

2207. The plant rhythms have oscillatory character like a pendulum.

2208. The biological clocks do not require resetting.

2209. The endogenous rhythms are not affected by any metabolic inhibitors.

2210. A particular lunar rhythm is likely to be independent of the prevailing day length conditions.

2211. Tidal rhythms are affected by the temperature conditions also.

2212. The biological clock of the cell can be seen under the electron microscope.

2213. Endogenous rhythms and biological clocks are unrelated things.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2214. Endogenous rhythms
   a. persist indefinitely without entraining.
   b. continue for several cycles without entraining.
   c. must be entrained by an external factor in each cycle otherwise they stop.
   d. can be easily destroyed by adverse external conditions.

2215. For a circadian rhythm the period is approximately
   a. 48 hours.
   b. about a year.
   c. 24 hours.
   d. 12 hours.

2216. The biological clocks are possibly associated with one of the following levels of organization.
   a. Organ
   b. Cell
   c. Tissue
   d. Molecule

2217. In *Phaseolus* the leaf movement is the expression of circadian rhythm. One can observe this rhythm by
   a. measuring the petiole length.
   b. measuring the length of the leaf blade.
   c. measuring the angle between the petiole and stem axis.
   d. preventing the leaf from moving by applying mechanical force.

2218. Which one of the following is not an example of endogenous rhythm ?
  a. Rate of CO_2 uptake at different times during the day.
  b. Release of gametes in the alga *Dictyota*.
  c. Flowering in perennial tree.
  d. Reversal of direction in cytoplasmic streaming in some slime moulds.

Short Answer Type

2219. The following are a few examplss of plant rhythms
  1. ....
  2. ....
  3. ....

2220. Give the approximate length of the cycle of the following.
  1. Lunar rhythms
  2. Circadian rhythms
  3. Annual rhythms
  4. Tidal rhythms

2221. What are the possible entraining factors for the following rhythmic phenomena ?
  1. Production of fragrance in queen of night.
  2. Reversal of direction in the cytoplasmic stearming of certain slime moulds.
  3. Release of gametes in the marine alga, *Dictyota*.
  4. Sprouting of buds in the spring
  5. Falling of leaves in autumn in case of deciduous trees.

2222. Give two examples each of the exogenous and endogenous rhythms.

Essay Type

2223. Give examples of different types of rhythms in plants.

2224. Through the example of the rotation of a wheel explain periodicity of a rhythmic phenomenon. Give sutiable diagrams to illustrate your answer.

2225. Explain the difference between endogenous and exogenous rhythms. Provide as many examples of each type as you can.

226. Give a brief account of the nature of the biological clock.

CHAPTER 23

Systematics as a Discipline

Completion Type

Fill in the blanks with suitable words.

2301. .... is the father of Taxonomy.

2302. The system of arrangement of organisms into groups showing relationship is known as ....

2303. The scientific name of human being is ....

2304. The theory of organic evolution was put forward by ....

True-False Type

Write T if the statement is true, F if it is false.

2305. Systematics is the science dealing with classification and naming of organisms.

2306. Aristotle was the first to make observations on living organisms and classify them.

2307. Hippocrates was the author of *Systema Naturae* published in 1753.

2308. Taxonomy is the study of living and non-living.

2309. Nomenclature is the process of giving scientific names to plants and animals.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2310. The science which deals with classification, identification and naming of organisms is known as
- a. *Physiology.*
- b. *Ecology.*
- c. *Systematics.*
- d. *Biology.*

2311. The father of taxonomy is
- a. Charles Darwin.
- b. John Ray.
- c. Julian Huxley.
- d. Carolus Linnaeus.

2312. The theory of organic evolution was put forward by
- a. Charles Darwin.
- b. John Ray.
- c. Julian Huxley.
- d. Carolus Linnaeus.

Short Answer Type

2313. Define systematics.

2314. Who is the father of Taxonomy ?

2315. What do you know about Charles Darwin ?

2316. What is New systematics ?

2317. What are important contributions of Carolus Linnaeus to the science of Taxonomy ?

2318. Define Classification.

2319. Define Taxonomy.

2320. Define nomenclature.

2321. Who proposed the term "New systematics".

Essay Type

2322. Give a brief account of the origin and development of the science of systematics.

CHAPTER 24

Utility of Systematics

Completion Type

Fill in the blanks with suitable words.

2401. The study of systematics is of importance to mankind because it helped in protection of human-..................

2402. The systematics forms a part cf natural history and it is an .... science.

2403. The introduction of harmful plants and animals to a country can be prevented and protected by their ....

2404. The study of systematics is useful to all sectors of ....

True-False Type

Write T if the statement is true, F if it is false.

2405. Systematics is not an observational science.

2406. Insects are major parts of our crop plants.

2407. Systematics is of value in the identification and breeding of a number of economically important crop plants.

2408. Conservation of beneficial animals and plants requires a knowledge of systematics.

2409. In conservation of fishes and natural resources, the study of systematics is not of relevance.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2410. Important transmissible diseases like Malaria, Filaria, Dengue, and Kala-azar are transmitted by
   a. house flies.
   b. mosquitoes.
   c. cockroaches.
   d. reptiles.

2411. Knowledge of systematics is complementary to
   a. ecology.
   b. genetics.
   c. cytology.
   d. all of the above.

2412 Mosquitoes are known to transmit
   a. cholera.
   b. typhoid.
   c. malaria.
   d. influenza.

Short Answer Type

2413. What is the significance of systematics to the study of Applied Biology ?

Essay Type

2414. Discuss the utility of systematics.

2415. Describe the utility of systematics in biological sciences.

2416. Give brief account of systematics and organic diversity.

2417. How is the study of systematics helpful to man ?

CHAPTER 25

Principles of Classical and New Systematics

Completion Type

Fill in the blanks with suitable words.

2501. Natural system of classification of plant kingdom was proposed by .:......................

2502. The term New systematics was introduced by..............

2503. Phylogenetic system of classification of plant kingdom was proposed by ....

2504. Numerical taxonomy utilizes .... in taxonomy.

True-False Type

Write T if the statement is true, F if it is false.

2505. Natural system of clasification is one in which different categories of organisms are recognised on the basis of one or a few superficial resemblances or differences.

2506. Phylogenetic system is one in which plants are arranged and grouped in their evolutionary sequance.

2507. Artificial system of clascification avoids the grouping of heterogenous and unrelated organisms.

2508. It was Charles Darwin who successfully established the truth of evolution.

2509. The classification of plants on the basis of number of stamens and carpels given by Linnaeus is artificial.

2510. Cytotaxonomy is based upon the classification of plants and animals on the basis of chromosome number.

2511. Phylogenetic system of classification was proposed by Bentham and Hooker.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2512. The natural system of classification of plants was proposed by
   a. Carolus Linnaeus.
   b. Julian Huxley.
   c. Bentham and Hooker.
   d. Engler and Prantl.

2513. Phylogenetic system of classification of plant kingdom was proposed by
   a. Carolus Linnaeus.
   b. Julian Huxley.
   c. Engler and Prantl.
   d. Bentham and Hooker.

2514. Biochemical characters of organisms forms the basis of classification called as
   a. *Systematics.*
   b. *Ecology.*
   c. *Numerical taxonomy.*
   d. *Biochemical systematics.*

2515. The classification of plants into herbs, undershrubs, shrubs and trees is.
   a. artificial.
   b. phylogenetic
   c. natural.

Matching Type

Match the different items of column I to the appropriate items in column II.

	Column I	*Column II*
2516.	A. Artificial system	a. Charles Darwin
	B. Natural system	b. Engler and Prantl
	C. Phylogenetic system	c. Bentham and Hooker
		d. Linnaeus
2517.	A. New systematics	a. statistical methods in taxonomy
	B. Biochemical systematics	b. Julian Huxley
	C. Cytotaxonomy	c. number of cells in an organisms
	D. Numerical taxonomy	d. biochemical characters of orgaisms
		e. chromosome number of organisms

Short Answer Type

2518. Name two eras of classical systematics.

2519. Define typological concept of species.

2520. State briefly the impact of Darwin upon systematics.

2521. State briefly the artificial system adopted by Pliny.

2522. Define artificial system of classification.

2523. Define natural system of classification.

2524. Define phylogenetic system of classification.

2525. State one point to differentiate botanists and zoologists interpretation of natural system.

Essay Type

2526. Give an account of various systems of classification.

2527. Correlate the relationship between the doctrine of evolution and systematics.

CHAPTER 26

Binomial Nomenclature

Completion Type

Fill in the blanks with suitable words.

2601. According to the binomial system of nomenclature, the first name refers to the genus and the second name is meant for the ....

2602. Mostly the scientific names are derived from...............language.

2603. The person who introduced binomial system of nomenclature was..............

2604. During 16th century............changed binary generic names to single ones.

2605. The scientific name of man is........................

2606. The scientific name of mustard is......................

2607. The scientific names are usually printed in.........type.

True-False Type

Write T if the statement is true, F if it is false.

2608. Brunfels is credited with introducing binomial system of nomenclature.

2609. Nomenclature means naming of plants and animals around us.

2610. According to the binomial system of nomenclature, the name of a plant or animal is composed of two words in English language.

2611. The scientific name of a mango plant is *Mangifera indica.*

2612. As per the recommendations of International code of Botanical and Zoological nomenclature, a name should be derived from two languages.

2613. In *Mangifera indica* Linn., Linn refers to the name of the author Linnaeus.

Multiple Choice Type

Tick (√) mark correct answer in each of the following cases.

2614. The scientific name of tamarind (Imli) is *Tamarindus indica* L. Where the letter L. means
   a. that the word was derived from latin language.
   b. that the name of the plant was coined by botanist Linnaeus.
   c. that the word L. is not properly used.
   d. that the name is not correctly written.

2615. The name of the author of the species is always printed in
   a. roman type.
   b. italic type.
   c. bold type.
   d. bold italic type.

2616. In *Mangifera indica* the first name denotes the name of the
   a. family.
   b. species.
   c. genus.
   d. variety.

Short Answer Type

2617. Who introduced the binomial system of nomenclature ?

2618. What is nomenclature ?

2619. What is scientific nomenclature ?

2620. What is International code of Botanical nomenclature ?

2621. What is International code of Zoological nomenclature ?

2622. How are zoological and botanical specimens named ?

2623. What are the suggestions for naming a plant or an animal ?

2624. What are the advantages of scientific names ?

Essay Type

2625. Write in detail about the systems of nomenclature with special reference to binomial system of nomenclature.

2626. What is binomial system of nomenclature ? Give five examples of the scientific names of common plants and animals.

CHAPTER 27

Familiarity with Taxa

Completion Type

Fill in the blanks with suitable words.

2701. The unit of classification of organisms which can be recognised and assigned to a definite category at any level of classification is known as...............

2702. The highest category in the classification is...............

2703. The lowest category in classification is...............

2704. The scientific name of lion is...............

2705. The scientific name of tiger is...............

2706. The scientific name of potato is...............

2707. An assemblage of related species is...............

2708. The taxonomic category which includes a number of related genera is...............

2709. ....includes related families.

2710. The category which includes organisms of related order is known as...............

2711. Classes of different organisms having some common features are included in a common category known as ....

True-False Type

Write T if the statement is true, F if it is false.

2712. The Linnaean hierarchy consists of ascending sequence of seven obligatory categories.

2713. The highest category in the classification is phylum.

2714. The lowest category in classification is genus.

2715. A genus is an assemblage of related species.

2716. *In Panthera tigris, tigris* is the generic name.

2717. Man, monkey, rat, lion and tiger belong to the same class mammalia.

2718. Species inhabiting different geographical areas are called sympatric species.

2719 Taxonomic species are those which are provided with specific names as per the recommendations of international botanical congress.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2720 The highest taxonomic category is

a. order.
b. family.
c. class.
d. phylum.

2721. The lowest taxonomic category in universal usage is

a. order.
b. family.
c. genus.
d. species.

2722. In *Mangifera indica*, indica is the

a. name of the genus.
b. name of the species.
c. name of the family.
d. name of the order.

2723. Man is classified under the class
- a. reptilia.
- b. mammalia.
- c. aves.
- d. amphibia.

2724. The species inhabiting different geographical areas are
- a. allopatric species.
- b. sympatric species.
- c. sibling species.
- d. taxonomic species.

2725. The species inhabiting the same geographical areas are
- a. allopatric species.
- b. sympatric species.
- c. sibling species.
- d. taxonomic species.

Short Answer Type

2726. Define any two of the following.

a. Phylum	c. Order	e. Genus
b. Class	d. Family	f. Species.

2727. Define taxon and category in the system of classification.

2728. Define species with three examples.

2729. What are sibling species ?

2730. How does allopatric species differ from sympatric species ?

2731. Differentiate between biospecies, genetic species, morphospecies and taxonomic species.

Essay Type

2732. Give an account of Linnaean system of classification.

2733. What are taxonomic categories in the Linnaean system of classification ? Give atleast two suitable examples.

2734. What are different types of species ? Give examples of any two types.

CHAPTER 28

Systems of Plant and Animal Classification

Completion Type

Fill in the blanks with suitable words.

2801. Artificial system of classification was proposed by................

2802. *Species Plantarum* was written by................

2803. The author of *Die Naturlichen familien* is................

2804. "Families of flowering plants" was written by................

2805. "The origin of species" was written by................

2806. *Origin of species* was published in the year................

2807. In case of artificial classification more stress was laid on set of characters.

2808. It was...........who first classified animals into groups.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases

2809. Artificial system of classification was proposed by
   - a. Carolus Linnaeus.
   - b. Caspe Bauhin.
   - c. Engler and Prantl.
   - d. Darwin.

2810. The Linnaean system of classification contains
- a. 4 classes of plants.
- b. 8 classes of plants.
- c. 16 classes of plants.
- d. 24 classes of plants.

2811. Darwin is the author of
- a. *Genera Plantarum.*
- b. *Species Plantarum.*
- c. *Origin of Species.*
- d. *Die Naturlichen Familien.*

2812. *Genera Plantarum* was published in the year
- a. 1859.
- b. 1753.
- c. 1857.
- d. 1934.

2813. Cryptogams include
- a. seedless plants.
- b. seeded plants.
- c. plants having flowers.
- d. plants with naked seeds.

2814. Angiosperms include plants with
- a. no flowers.
- b. exposed flowers.
- c. no fruits.
- d. no sex organs.

2815. Hutchinson revised his own system of classification in the year
- a. 1934.
- b. 1949.
- c. 1959.
- d. 1859.

2816. Who was the first to classify animals into groups ?
- a. Auerbauch
- b. Aristotle
- c. Carolus Linnaeus
- d. Darwin

2817. Who is regarded as the father of Botany ?

- a. Aristotle
- b. Darwin
- c. Theofrastus
- d. H.G. Khorana

2818. The vertical classification is based on the study of

- a. present day species.
- b. fossil records.
- c. internal anatomy.
- d. biochemical analysis.

2819 Dicotyledons were subdivided by Bentham and Hooker into

- a. polypetalae, gamopataleae and monochlamydeae.
- b. lignosae and herbaceae.
- c. gymnospermeae and angiospermae.
- d. archichlamydeae and sympetaleae.

2820. Polypatalae consists of 3 series

- a. thalamiflorae, disciflorae, calyciflorae.
- b. inferae, heteromerae, bicarpellatae.
- c. microspermae, glumaceae bicarpellatae.
- d. thalamiflorae, inferae, glumaceae.

Matching Type

2821. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. *Species Plantarum*	a. John Hutchinson
B. *Origin of Species*	b. Engler and Prantl
C. *Die Naturlichen Familien*	c. Carolus Linnaeus
D Families of flowering plants	d. Mendel
	e. Darwin

Column I	*Column II*
A. *John Hutchinson*	a. Natural system of classification
B. *Darwin*	b. Artificial system of classification
C. *Carolus Linnaeus*	e. Phylogenetic system of classification
D. Bentham and Hooker	d. Classification based on genetics
	e. Classification based on evolution

Short Answer Type

2823. Define any two of the following
  a. Artificial system of classification
  b. Natural system of classification
  c. Phylogenetic system of classification

2824. What are the major contributions of the following ?
  a. Carolus Linneaus
  b. Hutchinson
  c. Engler and Prantl
  d. George Bentham and Joseph Dalton Hooker

2825. Who introduced the artificial system of classification? Mention the year.

2826. Describe one important character of each of the following
  a. Angiosperms
  b. Gymnosperms
  c. Vertebrates
  d. Invertebrates

2827. Name the sub divisions of angiosperms.

2828. Give two characters of each of the subdivisions of the angiosperms.

2829. Who was the person to introduce the theory of organic evolution. Mention the year.

2830. Who was the first to classify animals into groups ?

2831. Define Numerical taxonomy ?

2832. What is vertical classification ?

2833. What are the two classes of angiospermae ?

Essay Type

2834. Give an account of artificial system of classification. How does it differs from natural system of classification ?

2835. Give an account of natural system of classification with suitable examples.

2836. Discuss the system of classification based on the concept of organic evolution. Why was it not preferred ?

2837. Give a brief account of phylogenetic system of classification with suitable examples from plant kingdom.

2838. Describe Engler's system of classification drawing attention to its merits and demerits.

2839. Give a brief outline of Hutchinson's system of classification with special reference to its merits and demerits.

2840. Give an account of systems of classification for animal kingdom.

2841. "The classification of animals and plants forms and important and basic activity in biological sciences." Discuss the statement with special reference to evolution of present day species from ancestors.

2842. Discuss the importance of Carolus Linnaeus' contribution to the classification.

2843. Describe briefly the theory of organic evolution.

2844. Give an account of the system of classification adopted for animals.

2845. Mention the contributions of Aristotle and Carolus Linnaeus to the system of animal classification.

2846. Explain the terms numerical and vertical taxonomy.

CHAPTER 29

Outline Classification of the Plant and Animal Kingdoms

Completion Type

Fill in the blanks with suitable words.

2901. Legume fruit is the characteristic fruit of the family............... .

2902. Stamens in the family Cruciferae are....................... .

2903. Obliquely placed ovary with axile placentation is found in the family....................... .

2904. One of the characteristic features of the family Compositae is the ....inflorescence.

2905. In family Ranunculaceae, the G noecium is........................... .

2906. Cruciform corolla is found in the family............................. .

2907. The fruit of the family Gramineae is.......................... .

2908. The flowers of the family Liliaceae are..................... .

2909. Corolla is the term applied for a group of................. .

2910. Calyx is used for a group of.................... .

2911. Androecium is the term used for a group of...................... .

2912. The characteristic fruit of the family Cruciferae is................. .

2913. In family Leguminosae the placentation is.......................... .

9914. In sub family Papilionoideae, the androecium is................. : .

2915. Thephylum chordata derives its name due to presence of a........ .

2916. Subphylum vertebrata is divided into.................and........... super classes.

2917. Elasmobranch fishes belong to the class............................. .

2918. Gnathostomata has been divided into.........................classes.

2919. Ascidia and Doliolum included under the class.................... .

True-False Type

Write T if the statement is true, F if it is false.

2921. K is the symbol used for corolla.

2922. A is used for Androecium.

2923. C represents corolla.

2924. Regular flowers are generally actinomorphic.

2925. The parts of the flower facing the mother axis are called anterior parts.

2926. Dicotyledonae includes those familes which have two cotyledons in their seeds.

2927. Wheat and maize are not important food crops of India.

2928. Sugarcane is a member of family Compositae.

2929. *Allium cepa* is a member of family Liliaceae.

2930 In family Liliaceae gynoecium is syncarpous having tricarpellary and inferior ovary.

2931. Colchicine is obtained from corns.

2932. Family of aquatic plants included in your syllabus is Nymphaeaceae.

2933. Black cumin is obtained from *Nigella sativa*.

2934. *Magnolia* is a herb.

2935. Botanical name of black mustard is *Brassica nigra.*

2936. Cabbage and cauliflower belong to family Leguminosae.

2937. In family Leguminosae, the leaves are compound.

2938. Obliquely placed swollen placenta is found in family Solanaceae.

2939. Tobacco, Tomato and Potato are members of the same family.

2940. Botanical name of chillies is *Nicotiana tobaccum.*

2941. Head or Capitulum inflorescence is found in family Compositae.

2942. Marigold and zinnia belong to the family Compositae.

2943. Entamoeba and Euglena are multicellular organisms.

2944. Sycon is an example of Protozoa.

2945. Sessile or free floating animals are known as Pelagic.

2946. Liver fluke and tapeworm belong to the phylum Aschelminthes.

2947. Arthropodes are characterised by jointed (segmented) appendages.

2948. Annelida is the biggest phylym of animal kingdom.

2949. Man belongs to phylum chordata and class mammalia.

2950. Balanoglossus is an example of hemichordata.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

2951. Floral diagram represents the
   a. position of the flower.
   b. number and arrangement of floral parts in the flower.
   c. structure of the flower.
   d. the habit of the plant.

2952. Gramineae includes plants which are usually

a. herbs.
b. shrubs.
c. undershrubs.
d. trees.

2953. P_2 (lodicules) A_{3+3} $\underline{G}_1$ is the floral formula of the family

a. Liliaceae.
b. Compositae.
c. Gramineae.
d. Leguminosae.

2954. Bisexual flower is a flower in which

a. only petals are present.
b. only stamens are present.
c. only gynoecium is present.
d. both stamens and pistil are present.

2955. Perianth is reduced to lodicules in the family

a. Liliaceae.
b. Gramineae.
c. Compositae.
d. Magnoliaceae.

2956. Most important cereal crop of India is

a. *Nymphaea lotus.*
b. *Allium cepa.*
c. *Triticum vulgare.*
d. *Pisum sativum.*

2957. Magnoliaceae is a family of

a. herbaceous plants.
b. weak stems.
c. twiners.
d. woody trees.

2958. Papillonaceous corolla is found in

a. *Pisum sativum.*
b. *Mimosa pudica.*
c. *Delonix regia.*
d. *Brassica campestris.*

2959. Mimosoideae is charecterised by

a. 10 stamens in two whorls of 5 each.
b. 10 stamens out of which 3 are staminodes.
c. 10 free stamens.
d. numerus free stamens.

2960. *Tamarindus indica*, the common tamarind tree belongs to

a. Cruciferae.
b. Mimosoideae.
c. Caesalpinioideae.
d. Papilionoideae.

2961. A flower has five fused sepals, five fused petals, 5 epipetalous free stamens and bicarpellary, syncarpous superior ovary with swollen axile oblique placenta. Which family will you assign to the flower ?

a. Solanaceae
b. Leguminosae
c. Compositae
d. Cruciferae

2962. Compositae family has

a. spike inflorescence.
b. raceme inflorescence.
c. umbel inflorescence.
d. head or capitulum.

2963. The floral formula of the family Compositae is

a. $K_5C_5A_5G_{\underline{(2)}}$
b. $K_5C_5A_{(9)+1}\underline{G_1}$.
c. $K_6C_6H_{6+6}'G_{\underline{(3)}}$
d. K pappus $C_{(5)}A_5G_{\overline{(2)}}$

2964. *Fasciola* is included under the phylum
  a. Protozoa.
  b. Coelentrata.
  c. Annelida.
  d. Platyhelminthes.

2965. Which one of the following belongs to the phylum Echinodermata ?
  a. *Sepia*
  b. *Chiton*
  c. *Philodina*
  d. *Echinus*

2966. Phylum vertebrata is characterised by
  a. triploblastic and segmented body.
  b. respiration by dermal branchi.
  c. presence of vertebral column.
  d. absence of post anal tale.

2967. In which of the following class body of the animal is covered with horny epidermal scales?
  a. Amphibia
  b. Reptilia
  c. Aves
  d. Cyclostomate

2968. Birds are characterised by the presence of
  a. only right aortic arch.
  b. only left aortic arch.
  c. three chambered heart.
  d. gills.

2969. Zoological name of dog is
  a. *Hylobates.*
  b. *Pteropus.*
  c. *Canis familans.*
  d. *Protopterus.*

2970. Dentition of whale is of

a. one type.
b. two types.
c. three types.
d. four types.

Matching Type

Math the different items of column I to the appropriate items in column II.

	column I	Column II
2971.	A. Potato	a. *Raphanus sativus*
	B. Rice	b. *Solanum tuberosum*
	C. Wheat	c. *Oryza sativa*
	D. Radish	d. *Solanum nigrum*
	E. Lotus	e. *Triticum vulgare*
		f. *Nymphaea lotus*
		g. *Brassica compestris*

2972.	A. Blood fluke	a. *Taenia*
	B. Tapeworm	b. *Lycosa*
	C. Spider	c. *Limulus*
	D. Shrimps	d. *Fasciola*
	E. Kingcrab	e. *Schistosoma*
		f. *Pennaeus*
		g. *Bombyx*

2973.	A. *Myxine*	a. Electric ray
	B. *Zygaena*	b. Dogfish
	C. *Torpedo*	c. Garden lizard
	D. *Protopterus*	d. Hagfish
	E. *Ichthiopyhis*	e. Limbless-lizard
	F. *Calotes*	f. Hammerheaded shark
		g. Lungfish

2974. A. *Ptyas*	a. Pigeon
B. *Najan-naja*	b. Bat
C. *Coiumba*	c. Rat snake
D. *Pteropus*	d. Bandicoot
E. *Bandicotta benghalens*	e. Cobra
F. *Cavia*	f. Squirrel
G. *Bos indicus*	g. Langoor
	h' Dolphin
	i. Cow

2975. A. Ranunculaceae	a. *Annona squamosa*
B. Leguminosae	b, *Helianthus annus*
C. Compositae	c. *Solanum tuberosum*
D. Cruciferae	d. *Iberis amara*
E. Annonaceae	e. *Nigella sativa*
	f. *Mimosa pudica*

2976. A. Berry	a. *Pisum sativum*
B. Capsule	b. *Acacia nilotica*
C. Siliqua	c. *Michelia champaca*
D, Lagume	d. *Solanum melanogena*
E. Lomentum	e. *Datura alba*
	f. *Brassica campestris*

2977. A. Axile	a. Compositae
B. Marginal	b. Cruciferae
C. Parietal	c. Liliaceae
D. Basal	d. Leguminosae
	e. Magnoliaceae

2978. A. Jaws with horny beak, no teeth	a. Mammalia
B. Excretion by nephridia	b. Reptilia
C. Placenta present	c. Wrochordata
D. Body covered with horny epidermal scales.	d. Echinodermata
E. Most primitive aminals	e. Protozoa
	f: Annelida
	g, Aves

Short Answer Type

2979. Define floral formula?

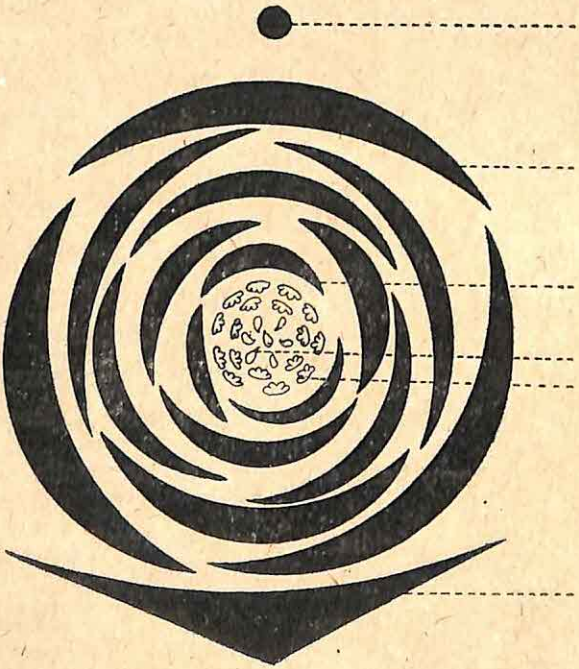
2980. Define floral diagram?

2981 Give the floral formula of a bisexual, actinomorphic, hypogynous, flower with 5 fused sepals, 5 fused patals, 5 epipetalous stamens and bicarpellary, synacarpous, superior ovary.

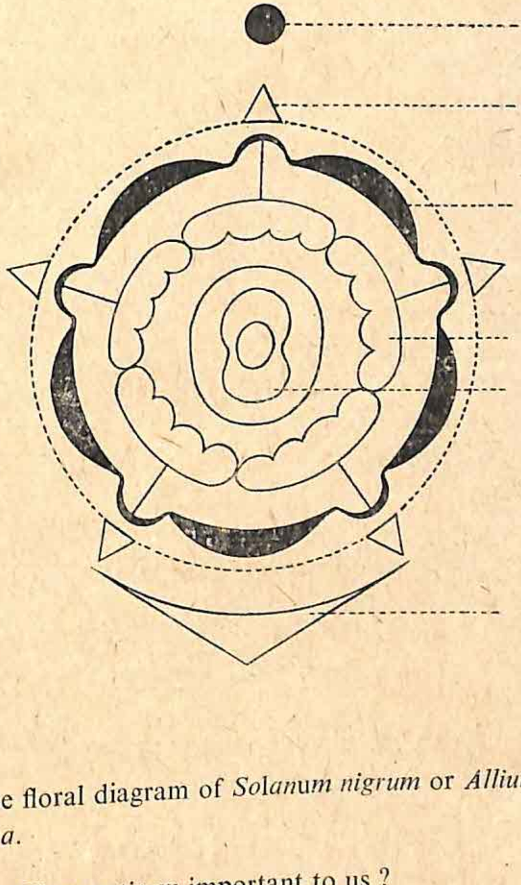
2982. To which family would you assign the following floral formula?
$K_4\ C_{2+2}\ A_{2+4} G_{(\underline{2})}$

2983. Give the floral formula of family Leguminosae.

2984. To which family does the following floral diagram belongs to ? Lable the parts indicated.



2985. State the family of the following diagram and label various parts indicated.



2986. Give the floral diagram of *Solanum nigrum* or *Allium cepa* or *Oryza sativa*.

2987. How is *Allium sativum* important to us ?

2988. What is the economic importance of *Solanum tuberosum* or *Oryza sativa* ?

2989. Give the botanical names of any three of the following ?

a. Onion
b. Radish
c. Wheat
d. Custard apple
e. Jasmine

2990. State the type of fruit found in the following families.
   a. Leguninosae
   b. Cruciferae
   c. Compositae

2991. To which phylum do the following three belong ?
   a. Amoeba
   b. Mosquito
   c. Starfish

2992. To which class, do the following three vertebrates belong ?
   a. Salamander
   b. Pigeon
   c. Man

2293. Give the zoological name of any three of the following.
   a. Silkworm
   b. Scorpion
   c. Camel

2994. What is the botanical name of the national flower of India ?

2995. What is the name of national bird of India?

Essay Type

2996. Give a brief account of the criteria used for description of plants.

2997. Describe the salient features of the family Compositae.

2998. Name the most economically important family of flowering plants. Give reasons for your answer with suitable examples.

2999. Describe any one of the families of flowering plants studied by you.

29100. Distinguish between the following pairs of families on the basis of fruits.
   a. Cruciferae and Solanaceee
   b. Compositae and Gramineae
   c. Leguminosae and Ranunculaceae

29101. Describe the stamens of any two of the following.

a. Compositae

b. Papilionatae

c. Cruciferae

29102. Describe the gynoecium of the follwing.

a. Liliaceae

b. Ranunculaceae

29103. With the help of sketches, describe a flower of the family Leguminosae.

29104. Name a major invertebrate phylum and state the salient features of this phylum with examples.

29105. Describe the subphyla of the phylum chordata. Give salient features with examples.

29106 Enumerate the salient features of the class amphibia or reptilia with examples.

29107. Describe the salient features of class aves or mammalia.

29108. Classify and describe the salient features of cephalo-chordata.

29109. Give a brief account of hemichordates.

29110. What are cyclostomes?

29111. Classify sub-phylum vertebrata giving an example for each class.

Other Types

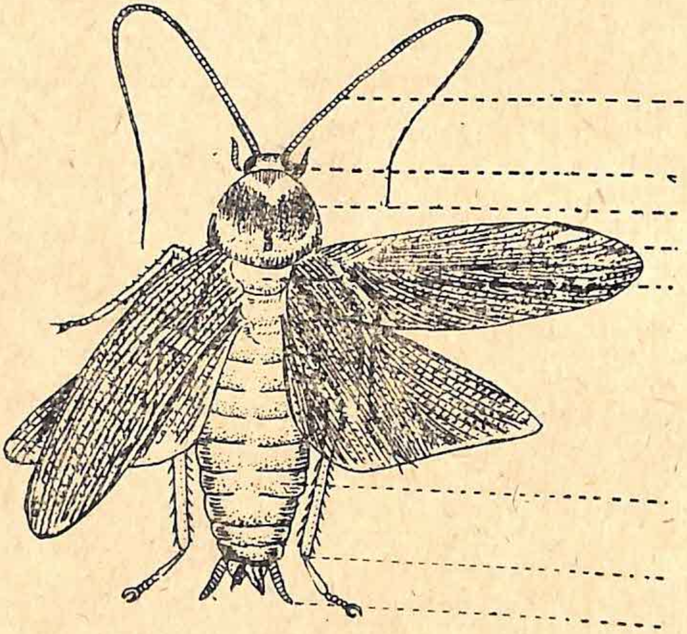
29112. Draw diagrams of any two of the following

a. *Traypansoma*

b. *Hydra*

c. Leech

29113. Label different parts of the following diagram.



29114. Draw floral parts of the flower of *Pisum sativum.*

29115. Give a diagrammatic sketch of L.S. of flower of *Nymphaea lotus.*

CHAPTER 30

Collection and Identification of Animals and Plants

Completion Type

Fill in the blanks with suitable words.

3001. All the identified material should be subsequently...............and stored in a...............

3002. The animal dies in a...............condition and does not need any narcotization if kept in a water filled jar with the lid closed.

3003. The cockroaches can be killed by placing them in a bottle containing some cotton wool and...............

3004. Prawns can be preserved in...............

3005. Frogs and toads die if kept in a jar containing cotton soaked with...............

3006. Frogs and toads can be preserved in...............

3007. Rats can be easily collected by...............

3008. When the literature of a particular region is unknown reference should be made to Blake and Atwood guide to...............

True-False Type

Write T if the statement is true, F if it is false.

3009. The cockroaches can be killed by placing them in a bottle containing ether.

3010. Prawns are found in the deserts.

3011. Frogs can be preserved in formalin.

3012. Frogs and toads die if kept in a jar containing cotton soaked with chloroform.

3013. Rats can be collected by traps.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3014. The objective of field collection and preservation in a herbarium is
   a. to maintain a permanent record of a series of specimens to furnish information about plants under study.
   b. to decorate tho herbaria with different kinds of plants.
   c. to keep the staff of the herbaria engaged in their work.
   d. to furnish information about the habitat of the plants.

3015. The plant press is used as a device
   a. to keep the collected specimens fresh for a long time.
   b. for pressing specimens flat for drying them quickly.
   c. to display plant materials in the exhibitions.
   d. to scoop out plants from the soil.

Short Answer Type

3016. List the important articles to be carried for field observations and records.

3017. Name three chemicals by which *Pila* can be narcotised.

3018. Where is the land snail *Achatina* found ?

3019. Name tbe most suitable preservative for all types of molluscs.

3020. What important features would you observe and record for molluscs ?

3021. Name atleast three places where cockroaches can be found.

3022. Where are prawns found ?

3023. Why do prawns come to the surface of the pond at night ?

3024. Where are fishes found ?

3025. Name a few common fresh water fishes.

3026. What will happen if the fishes are kept out of water ?

3027. How fishes can be killed for study ?

3028. Why is it difficult to work with specimens preserved with formalin ?

3029. Give the habitat of frogs and toads.

3030. Name the fixatives used for frogs.

3031. List the important features you will like to observe in the frogs and toads.

3032. List three articles which may be used for collecting pigeons.

3033. Name the preservative for pigeons.

3034. Name the important characters of the rat which you will like to observe.

3035. Enumerate the essential equipments used for field work.

3036. Name two herbaria of the world.

3037. Name two different kinds of keys used for identification.

Essay Type

3038. Give an outline how will you record your observations ?

3039. State briefly about the collection and preservation of animals.

3040. How *Achatina* can be killed for study.

3041. State briefly how cockroaches can be preserved ?

3042. Record the important characters of cockroach after your observations.

3043. Describe the important features of prawn.

3044. State briefly the method of preservation of fishes.

3045. Describe the important characteristic features of any common fish.

3046. State a method of preservation of a pigeon.

3047. Explain the important characters of a pigeon.

3048. List the diagnostic characters of the family Ranunclaceae.

3049. Write the important features of the family Nympheaceae.

3050. Write the characters of the family Solanaceae or Gramineae

3051. Explain the important characters of the family Liliaceae.

3052. Explain the functions of a plant press.

3053. What is the importance of a vasculun for plant collection.

3054. State briefly the method of preservation of the plants.

3055. How will you use the bracketed key for identification of plants ?

3056. How will you use the yoked key for identification of plants ?

3057. Make a key for the identification of animals.

CHAPTER 31

Growth of Human Population

Completion Type

Fill in the blanks with suitable words.

3101. Man belongs to family.................. .

3102. *Homo sapiens* is about.................years old.

3103. The average annual growth rate of human population in last three centuries is.................... .

3104. Under laboratory conditions the yeast cells show...........growth curve.

3105. The main ecosystems created by man at the cost of natural ones are.............. .

True-False Type

Write T if the statement is true, F if it is false.

3106. Biotic potential of a species increases under optimal conditions.

3107. Various factors of the environment do not help to decrease the biotic potential of the species.

3108. Predator free natural environment with plentiful food the reindeer population exhibits S-shaped growth curve.

3109. The ecosystem with biotic component only is a complete ecosystem.

3110. The increase in population of man has no effect on the biosphere.

3111. The death rate per annum is lower in developed countries than in devloping countries.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3112. Ecosystem is a self sustaining unit because it consists of
    a. plants and animals only.
    b. physical environment only.
    c. microbes only.
    d. all of the above.

3113. The population of *Homo sapiens* was 5.3 millions in
    a. 1550 A.D.
    b. 4000 B.C.
    c. 1650 A.D.
    d. 8000 B.C.

3114. The average annual birth rate per 1000 individuals in developing countries is
    a. 10.
    b. 17.
    c. 19.
    d. none of the above.

Matching Type

Match the different items of column I to the appropriate items in column II.

	Column I	*Column II*
3115.	A. Plantiful food supply to low population will result	a. middle phase
3116.	B. High population to low food supply will result	b. 173-35 years

3117.	C. Exponential rise of population is seen during the	c. J-shaped growth curve
3118.	D. Reproductive period of human female	d. S-shaped growth curve
3119.	E. Doubling period of human population from 1800-1960 declined from	e. 16-44 years f. 700 years

Short Answer Type

3120. Name the two major components of the biosphere.

3121. Name three components of the biotic community.

3122. Define the following.
   a. Population
   b. Ecosystem

3123. List the positive 'Checks' on human population as given by Malthus.

Essay Type

3124. Describe briefly the role man plays in modifying the natural ecosystems.

3125. Explain briefly the theory of Malthus on human population growth.

3126. Write how the increase in human population is affecting the biosphere ?

Other Types

3127. Draw the growth curve for small population growing in a predator free natural environment with plentiful food.

CHAPTER 32

Factors Controlling Population Distribution and Density.

Competion Type

Fill in the blanks with suitable words.

3201. Geographical, socio-economic and..................factors influence the distribution of human population in different regions of the world.

3202. Over........................percent of total world population lives in South East Asia, Europe and North Eastern part of North America.

3203. Density of a population in a place is obtained by dividing the total number of persons living in the given place by the total...............of the place.

3204. The Netherlands is much smaller than India yet its population density is higher than that of India. The reason for this difference is that more parts of Netherlands are...........as compared to that of India.

3205. Economically weak countries have..........................population concentrations.

3206. Asian population density is.................................than that in Europe.

3207. Very............. is the main cause of scanty human population in the polar regions.

3208. Although the tropical conditions are not conducive to human beings but because of suitability of tropical lands for.........large human populations are found here.

3209. Adequate sources of...........is one of the major causes of human settlements.

3210. Soils of river valleys are called as.....................soils.

3211. The development of..............industries is one of the main determinants of urbanised population growth.

3212. Means of transportation have played a major role in the.........of population.

3213. Problems of sewage disposal and sanitation have increased due to ....in the cities.

3214. Vital rates are the birth-rate, death rate and the rate of...........

3215. Very high birth and death rates were prevalent in ancient era and are still found in..............and.............. .

3216. High birth rate and moderate death rate are found in.............. .

3217. A population with a high fertility rate is..............than the one with low fertility rate.

3218. The dependency ratio is defined as The persons in dependent ages divided by........... .

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3219. Causes of uneven distribution of world's population in various regions may be due to
   a. geographical factors
   b. socio-economic factors.
   c. demographic factors.
   d. all the above factors.

3220. Major areas of population concentration in the world are

a. South East Asia, Japan, India

b. Europian countries.

c. Latin American countries.

d. North America.

3221. Density of a population in a given country is obtained by

a. dividing the total number of persons living in the country by the total land area.

b. dividing the total number of persons living in the country by the total fertile land area.

c. dividing the total number of persons living in the country by the total forest area.

d. dividing the total number of persons living in the country by the amount of production of natural resources.

3222. The population density of Netherlands is higher than that of India because of

a. more land area is there in Netherlands as compared to India.

b. greater proportion of inhabitable area is there in Netherlands than that of India.

c. greater economic advancement of Netherlands.

d. more natural resources in Netherlands.

3233. High population concentration of India is due to the

a. poor economic status of the country.

b. availability of fertile land.

c. industrial advancement.

d. non-availability of resourees.

3224. Very dense population of Indo-gangetic plains is due to the

a. availability of adequate river water.

b. fertile alluvial soil of the region.

c. both of the above factors.

d. presence of large cities.

3225. Some densly populated cities like Durgapur aud Bhilai have come up recently as a result of

a. removel of forests.

b. better transport facility.

c. better agricultural opportunities.

d. development of resource based industries.

3226. Most of the world's largest cities are found at the coastal locations primarily due to the

a. pleasant coastal climates.

b. availability of water.

c. availability of sea food.

d. fact that sea provides cheaper mode of transport.

3227. Basic cause of continued urban growth is due to the

a. better transport facility.

b. entertainment facility.

c. prosperity in cities.

d. better health facilities.

3228. Increasing urbanization causes

a. over crowding.

b. health and pollution hazards.

c. socio-economic problems.

d. all the above.

Essay Type

3229. Describe different phases of demographic transition.

3230. What are the causes population growth ? Define dependency ratio.

CHAPTER 33

Soil, Rainfall and Temperature with Reference to Natural Resources.

Completion Type

Fill in the blanks with suitable words.

3301. The ultimate source of hydrogen for the biological conservations and metabolism is......................... .

3302. Mineral components of soil is derived from weathered parent...... ....

3303. ....of the soil is formed by the decomposition of organic remains and excreta of animals and plants.

3304. Besides weathered parent rocks, organic matter, air and water, soil also consists of several kinds of................................ ,

3305. Weathered superficial crust of the earth is called as................ .

True-False Type

Write T if the statement is true, F if it is false.

3306. All the fertile soils of the earth are productive provided all the components are present.

3307. A fertile soil will be productive only when the soil is dry and the air is present.

3308. Temperature is one of the important components of climate since it controls soil formation also.

3309. The man has no role to play in the development of the soil.

3310. The quality of a given soil is assessed mainly on the basis of its fertility, texture, organic content and water-air relationship.

3311. The fertility of a soil has no relationship with its ability to support plant life.

3312. Fine particles of clay soils provide greater surface area for chemical and microbial activity.

3313. Structure of the soils depends on the spatial arrangement of the soil particles.

3314. The amount of water vapour in a unit weight of air is called absolute humidity.

3315. The atmosphere overlying the land water surface is called the troposphere.

3316. The electromagnetic radiations from the sun constitute the source of energy for all biological phenomena.

3317. Nearly sixty percent of the total solar energy is reflected by the troposphere to the outer space.

3118 Land and water surfaces absorbing equal amounts of solar radiations do not heat to equal temperatures.

3319. The land has no latent heat of vaporisation.

3320. Temperature and precipitation have almost no influence on the pattern of vegetation and animal life.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3321. The available supply of plant nutrients in soil can be reduced by many factors such as erosion, overcropping and minerals due to leaching. Such a soil can be made fertile again by adding

a. air.
b. water.
c. more organisms.
d. inorganic nutrients.

3332. Salinity of the soil is often caused due to the

a. accumulation of soluble minerals near or on the surface in arid regions.
b. excessive leaching.
c. rapid evaporation of surface water.
d. excessive addition of litter.

3323. Mineral nutrients lost from the soil may be restored by any one of the following methods

- a. activity of soil micro-organisms
- b. activity of inhabiting plants and animals
- c. excessive irrigation
- d. activity of soil micro-organisms, inhabiting plants, and animals

3324. In order to reclaim the soil in semi-arid and arid regions, the alkaline or saline soils are heavily irrigated and drained so that

- a. all the organic matter is removed.
- b. all water soluble minerals are removed.
- c. surplus amounts of basic elements are removed.
- d. the soil is made more acidic.

3325. A sandy loam has

- a. sand, silt and clay in equal proportion.
- b. more sand than silt and clay.
- c. clay in larger proportion than that of sand and silt.
- d. more silt and clay than the sand.

3326. Texture of a soil depends on

- a. organic matter of the soil.
- b. availability of water in soil.
- c. size of the mineral particles.
- d. microbial activity in the soil.

3327. Aggregate of finer soil particles improve the characteristics of the soil by

- a. increasing the permeability of soil to water and air.
- b. increasing permeability of soil to the roots and root hairs.
- c. increasing the water and nutrient holding capicity of the soil.
- d. all of the above.

3328. Water holding capacity of the soil depends upon

- a. size of its particles.
- b. amounts of organic matter.
- c. both (a) and (b).
- d. type of the parent rock.

3329. In water logged soils, plants die due to the

a. mineral deficiency.
b. execssive fomation of organic acids.
c. absence of air in the soil.
d. starvation.

3330. Plants can absorb capillary water only because

a. it does not allow air to circulate.
b. it allows air to circulate.
c. it is present in all types of soils.
d. it has dissolved oxygen in it.

3331. Tundra soils are cheracteristics of

a. moderately cold climate.
b. warm and humid climate.
c. extremely cold climate.
d. warm and dry climate.

3332. Podzols are found in

a. tropical zones.
b. temperate zones.
c. polar zones.
d. subtropical zones.

3333. Commonly found soil of India is frequently leached and is poor in nitrogen. Such a soil is also found in West Indies and Central Africa. It is called as

a. alluvial soil.
b. chernozen soil.
c. latosol.
d. prairie soil.

Essay Type

3334. What are the major sources of water on earth?

3335. Describe the effect of rainfall and temperature on the animal and plant life.

3336. What factors influence the cloud formation and rainfall.

CHAPTER 34

Our Natural Resources—Their Use and Abuse

Completion Type

Fill in the blanks with suitable words.

3401. Man uses...............to fulfil his various needs.

3402. Earth contains...............main types of natural resources.

3403. Natural resources based on abundance and availability can be classified into...............kinds.

3404. The subdivision of metallic and non-metallic groups are based on ....and...............properties.

3405. Modern industrialisation and urbanisation are based on...........

3406. The amount of energy is more at the...............level.

3407. Fossils are...............natural resources.

3408. Soil has both organic and...............resources.

3409. Based on composition water is a...............natural resource.

True-False Type

Write T if the statement is true, F if it is false.

3410. Oil is a renewable resource.

3411. Use of minerals in economic uses does not result into material cycle.

3412. Mineral extraction is a part of the material cycle.

3413. The energy driven material cycles lead to the deterioration of the environment.

3414. Every stage of mineral cycle does not use energy.

3415. The minerals of less importance to man are metallic minerals.

3416. The net energy balance in a modern agricultural ecosystem is positive.

3417. Nature always provides us pure water.

3418. India has plenty of ground water which is one of the factors responsible for green revolution.

3419. Food webs contain unidirectional chain.

3420. Oceans help in making the country economically sound.

3421. The loss of soil fertility through erosion is not influenced by floods.

3422. Even though the productivity and per capita forest area of the Indian forésts are low yet the Indian forests have played a significant role in the economic reconstruction of the country.

3423. The over use of pesticides and fertilizers in agriculture do not pollute the water.

3424. Fire wood is a useful fuel.

3425. The residue of gobar gas plant is harmful for crops.

3426. Frog→lion→grass is a correct food chain.

3427. The energy flow through the food chain is cyclic.

3428. The flow of energy through the ecological systems is irreversible.

3429. The energy generated by splitting 1 gm of U-235 is equal to the energy generated by burning 15 metric tons of coal.

3430. Uranium 235, Throium 232 are not potentially better sources of nuclear energy.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3431. Which one of the following group constitute the fossil fuels ?
   a. Coal, wood pieces and oil.
   b. Oil, wood pieces and dry dung.
   c. Natural gas, oil and wood pieces.
   d. Coal, oil and natural gas.

3432. Which one of the following is an example of both organic and inorganic resources ?
   a. Metallic ferrous ores
   b. Microbes
   c. Soil
   d. Air

3433. In how many groups earth's mineral reserves can be divided ?
   a. One group
   b. Two groups
   c. Three groups
   d. Four groups

3434. Which one of the following gives better idea of productivity of an ecosystem ?
   a. pyramid of biomass
   b_4 Pyramid of energy
   c. Pyramid of number
   d. All of the above

Matching Type

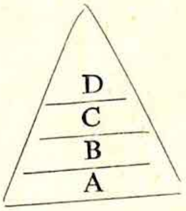
Match the different items of Column I to the appropriate items in Column II.

3435

Column I	*Column II*
A. Inexhaustible types of resources	a water, wood. natural pastures
B. Renewables	b fossil fuels, copper, iron and other ores
C. Non renewables	c air, sand and clay
	d air, water and copper

Column I	*Column II*
3436. *Proportion of world's population* (%)	*Proportion of word's energy consumption* (%)
A. 6%	a. 35
B. 7%	b. 3
C. 15%	c. 6
D. 1.5%	d. 16
E. 3%	e. 3
	f. 2

Column I	*Column II*
3437. *Mineral/ore*	*Estimated annual demand in 1980 (1000 tons)*
A. Nickel ore	a. 5
B. Copper	b. 212
C. Zinc	c. 131
D. Lead	d. 131
	e. 8,000

Column I	*Column II*
3438 *Ecological pyramid*	*Trophic level*
	a Primary carnivores b Herbivores c Producers d Secondary carnivores e Tertiary carnivore

Analogy Type

Observe the relatiohship between the first two words and then fill in the suitable word at the fourth place.

3439. Coal: Oil : : Dry dung:................

3440. Mineral : Non renewable : : Clay :................

3441. Grass : Grasshopper : : Frog :...............

Short Answer Type

3442. Name the three possible methods to increase the life spans of natural available resources ?

3443. List three main points showing how the increasing population affects the metallic minerals of India.

3444. Name the gases which are formed due to the burning of coal and petroleum ?

3445. Use of petroleum in mechanised agriculture is a costly affair. Name other alternatives to meet the needs of growing population.

3446. Name three atlernatives to replace fossil fuels.

3447. Write two substitutes for fire wood which are recently in use.

3448. Name two alternative foods for the growing human population.

3449. Define ecological pyramid.

3450. Define nuclear fusion.

3451. Define nuclear fission.

Essay Type

3452. How does fossil fuel meet the demand of growing population ?

3453. Explain the terms *renewable* and *non-renewable* resources.

3454. What will happen if all the forests are cleared ?

3455. List the various economic products of forests.

3456. What are the different chemical compounds responsible for hardness of water ?

3457. How water helps in increasing the economic structure of a country ?

3458. Ocean is an employer. Comment.

3459. Write about the resources of sea with special emphasis on the future resources of marine areas.

3460. Justify the statement that to be a vegetarian is in the interest of the country.

3461. The growing importance of animal protein leads to deforestation. Comment upon the statement.

3462. The environmental problems require global efforts. Discuss briefly.

3453. Most of the food chains in ecological systems are pyramidal type. Justify the statement.

3464. What are the different kinds of natural resources as per their abundance and availability?

Other Types

3465. Draw a map of India and fill the following ores found in abundance in respective states

a. Iron b. lead c. Zinc

3466. Construct a ecological pyramid of numbers in terrestrial habitat of the data given below

Producers	150000
Harbivores	26000
Primary carnivores	1300
Secondary carnivores	1

CHAPFER 35

Conservation of Forests and Wild Life

Completion Type

Fill in the blanks with suitable words.

3501. Starvation of Carnivores results due to the excessive hunting of animals.

3502. Native wild animal species move to other places due to cultivation of................land.

3503. The cropland ecosystems are more unstable than forests because of the food chain in the forest is plant.........................lion.

3504. Uncontrolled multiplication of deer population leads to mass starvation and even death due to its size exceeding the........... .

3205. The......................forests have highly stable productivity and biological diversity in comparasion to other types of forests.

3506. The active growth in coniferous evergreen and deciduous forests is confined to.................... .

3507. Forests constitute the best habitat for....................

3508. Wild life can be conserved by.................... .

3509. Land areas densely covered with trees are called................. .

3510. Cropland ecosystem is more unstable than a forest mainly because the ecosystems are typically........................ecological units.

3511. When there is capability of living together of a large number of different species of plants and animals it is called a..............

True-False Type

Write T if the statement is true, F if it is false.

3512. The gains or results of conservation can be realised quickly.

3513. Man is a herbivorous animal.

3514. The cropland ecosystems are more stable than the forests.

3515. The agricultural ecosystems are single species ecological units.

3516. Biological diversity does not lead to stability of the ecosystem.

3517. Food chains can be shortened by activities of man.

3518. Changes or modifications in the food chain due to the activities of man do not affect the biological diversity of the ecosystems.

3519. Stability of an ecosystem depends upon the factors like disturbance in the food chains.

3520. Coniferous forests have smaller number of species than deciduous forests.

3521. Deforestation is useful as it gives us more fuel to burn.

3522. Animal population is not effected by the change in the forest environment.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3524. The self cleansing property of the environment is lost as a result of disappearance of
   a. producers.
   b. consumers.
   c. scavangers.
   d. symbionts.

3525. The quality of the enviroment can be improved through
   a. erosion.
   b. conservation.
   c. overuse of natural environment.
   d. deforestation.

3526. Based on food habit man canbe categorsied as
- a. carnivorous animal.
- b. herbivorous animal.
- c. omnivorous animal.
- d. producer.

3527. Which one of the following forest is more diverse ?
- a. coniferous evergreen
- b. deciduous evergreen
- c. tropical rain forest
- d. subtropical rain forest

3528. Deciduous forests are the characteristic of the region having
- a severe winter only.
- b. warm summer only.
- c. less winter and warm summer.
- d. severe winter and warm summer.

3529. Which one of the following is most effective in controlling flood ?
- a. Deforestation
- b. Reforestation
- c. Constructing dams
- d. Digging deep canals

Maching Type

3530. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
Extinct animals	*Responsible factors*
A. Passenger pigeon	a. changes in the drainage pattern of swampy jungles
B. Pin headed duck	b. early European settlers
C. Bison	c. reforestation & hunting
D. Lion	d. deforestation & hunting
	e. Indiscriminate hunting

Short Answer Type

3531. Name the methods employed in a forest management programme.

3532. The timber trees generally take 15 to 100 years to mature. How does this knowledge help in forest management ?

3533. Write at least two points as to how to meet the growing demands of timber ?

Essay Type

3534. How deforestation leads to species's extinction ?

3535. What are the different methods for checking the extinction of wild life ?

3536. "Development oriented progress has caused environmental instability and degradation". Comment on the statement citing examples.

3537. How the proper methods of forest management play an important role in the conservation of forest resources ?

3538. List out the main categories of forests on the earth.

CHAPTER 36

Environmental Pollution

Completion Type

Fill in the blanks with suitable words.

3601. Important air pollutant in Ahmedabad is............................ .

3602. Air borne flourides damage crops and cause injury to cattle grazing in pastures contaminated with............ ... .

3603. Aerosols contain.................as propellants.

3604. Aerosols deplete.................in the stratosphere.

3605. ....in air beyond certain level causes lassitude, headache and disturbance of psychomotor function.

3606. Photochemically produced oxidants affect.................system.

3607. SO_2 pollution can be controlled by.................and.............. .

3608. Toxic chemicals act as pollutant at................ concentration.

3609. Bacteria and fungi decompose sewage organic substances into .... and ....

3610. Dissolved inorganic phosphorus is a major.................in surface water.

3611. Thermal pollution can upset metabolic activities of........animals.

3612. Mercury is transformed into methyl mercury by.................in the lake.

3613. Man is receiving DDT through the use of.............. .

3614. Limitations of primary and secondary processes are............... .

3615. In general effluent from secondary treatment contains............... and.................. .

3616. Chelating of phosphorus is done by addition of.................. .

3617. ....is main substance used in Canadian method of treatment of sewages.

3618. Certain bacteria eating protozoans of polluted water are ....and.................. .

3619. Two common secondary treatment processes of waste water are ....and.................. .

3620. Inactivated sludge process sewage is pumped into............... tank.

3621. In aeration tank sewage mixes with.................and............... .

3622. Function of bacteria is to.................. organic matter.

3623. Function of algae is to.................. O_2 for bacterial growth.

3624. Agricultural and agroindustrial waste can be removed by........... method.

3625. Recycling of waste can be one of the best means of prevention and control of.................. .

3626. Anaerobic digestion of waste produces..............and.............. gas.

True-False Type

Write T if the statement is true, F if it is false.

3627. Air pollution is serious problem for farmers living in the villages.

3628. Technological developments and industrialization is making life less unpleasant.

3629. Certain epiphytic lichens are reliable indicators of water pollution.

3630. Pest control is a chemical problem.

3631. Pollution is prevented by law in the industries.

3632. Farmers of India do not use inorganic fertilizers as they cause environmental pollution.

3633. Mudball technique minimizes the loss of nitrogen through leaching.

3634. Reverse osmosis means passing of more concentrated water to less concentrated solution.

3635. SO_2 as low as 60—7o $\mu g/m^3$ is harmful for animals.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3636. In a small town, pasture is contaminated with air borne fluorides. Grazing animals of that area will suffer from

a. goitre disease.
b. thyroid disease.
c. dental disease.
d. berri-berri.

3637. Ahmedabad has many textile mills, its important pollutant is

a. steam.
b. CO_2.
c. cotton dust.
d. SO_2.

3638. Strengthening of concept of environmental monitoring is due to our concern

a. for the quality of environment.
b. for the quantity of environment.
c. for quality of monitor.
d. for pure air.

3639. Typhoid disease spreads due to

a. polluted air.
b. adulterated food.
c. polluted water.
d. anger of goddess.

3640. Mudball technique has been proposed by
- a. Rice Research Institute, Cuttack.
- b. CSIR, New Delhi.
- c. Punjab Agriculture University, Ludhiana.
- d. The International Rice Research Institute in Philippines.

3641. Biomagnification is a process of
- a. magnification of animals.
- b. enlargement of aquatic animal.
- c. concentration of dangerous chemicals into body of members of food web.

3642. B.O.D. of a river was found to be very low, this means water
- a. was clean.
- b. was polluted.
- c. contained algae.
- d. contains other dissolved minerals.

3643. SO_2 pollution can be controlled by all the methods except by
- a. removing sulphur after combustion.
- b. precombustion desulphurization.
- c. electricity.
- d. photochemical oxidants.

3644. Nuclear power generates
- a. photo chemical pollution.
- b. SO_2 pollution.
- c. air pollution.
- d. thermal pollution.

3645. Many organic substances or organisms help in cleaning the water when found in
- a. high concentration.
- b. low concentration.
- c. moderate concentration.
- d. neutral concentration.

3646. When pollution load is more in the lakes there cannot be self-purification because

a. there is no O_2 to sustain microbial activity.

b. no sunlight is present.

c. microbes die.

d. pollutants settle down automatically.

3647. The level of tolerance for DDT is 10^{-2}ppm in case of Daphnia, therefore Daphnia

a. can live upto this concentration.

b. will die if concentration is lower than this.

c. can tolerate ten times more concentration of DDT than 10^{-2}ppm.

d. cannot tolerate DDT at all.

3648. Better method of pest control is

a. the use of chemical pesiticide.

b. the use of radio-active substances.

c. by using pesticide taking into account number and composition of pest population.

d. use of steam.

3649. Environmental monitoring helps in all except in

a. identifying pollution problem.

b. prescribing environmental quality standards.

c. predicting weather.

d. planning pollution abatement strategies.

3650. Automobiles discharge hydrocarbons and nitrous oxide in atmosphere which is further converted to

a. carbon monoxide.

b. ozone and other pollutants.

c. radioactive substance.

d. hydrochloric acid and nitrogen dioxide.

3651. In Calcutta 70% adults are suffering from bronchitis and TB due to

a. impure water.
b. adulterated food.
c. polluted air.
d. polluted soil.

3652. Air pollution is highest in

a. Calcutta.
b. Lucknow.
c. Panchmarhi.
d. Bhopal.

3653. Now-a-days DDT is not effective for killing mosquitoes because

a. mosquitoes population has become strong.
b. DDT is adulterated.
c. DDT has exerted selection pressure on the genetic variablity.
d. mosquitoes have developed adaptive resistance to pesticides.

3654. The population of hawks and eagles is declining because

a. of food scarcity.
b. of game lovers.
c. of excessive use of poisoned pesticides for killing pests.
d. very few dead animals are found in the fields.

3655. Certain epiphytic lichens indicate changing levels of atmospheric pollution specially of

a. SO_2
b. CO_2.
c. NO_2.
d. SO_3

3656. Visual range at 50% humidity is reduced when concentration of SO_2 exceeds

a. 100 $\mu g/m^3$.
b. 1000 $\mu g/m^3$.
c. 10 $\mu g/m^3$.
d. 1000 $\mu g/m^3$.

Matching Type

3657. Match the different items of column I to the appropriate items in column II.

Column I	*Column II*
A. Pollen, spores or cells of fungi	a. metallic pollutant
B. Lead, Chromium, nickel	b. crop spraying and dusting for pest control
C. Organic phosphates	c. air pollutants
D. Uranium, argon	d. crushing of radio active substances
E. Hydrocarbons, Nitrous oxide	e. Industries and automobiles

Short Answer Type

3658. Name the major cities of India which are threatened with environmental pollution.

3659. Name five important pollutants in the atmosphere of big cities of our country.

3660. Write one advantage of reverse osmosis.

3661. Give four examples of waste utilization.

3662. Define pollutant.

3663. Name five kinds of physical and chemical effects of a pollutant.

3664. Define level of tolerance.

3665. Name components of sewage fungi.

3666. Write at least one limitation of primary and secondary process.

3667. Write the advantages which the new method of treating sewage has over the conventional method.

3668. Define water pollution.

3669. A bucketful of water is collected from the river having pesticide and fungicide industry on its bank. Write five pollutants likely to be present in water.

3670. Name five Industries which mainly produce pollutants—inorganic and synthetic chemicals.

3671. Define biomagnification.

3672. Define pollution.

3673. Define environmental monitoring.

3674. Define air pollution.

Essay type

3675. What are the common sources of nitrogen oxide pollutants ?

3676. What preventive measures can be taken to control air pollution ?

3677. What do you understand by air quality standards ?

3678. What are the major pollutants of water ?

3679. Exaplain the primary treatment of waste water.

3680. Explain process of secondary treatment of waste water.

3681. Describe new method treatment of waste used by Canadian scientists.

2682. Explain the process of reverse osmosis.

3683. How the lakes and rivers clean themselves ?

3684. What kind of waste can be removed by recycling method ?

3685. What are the major effects of air pollutants ?

3686. What are air pollutants ?

CHAPTER 37

Radiation and Chemical Hazards

Completion Type

Fill in the blanks with suitable words.

3701. Many organisms are..................to tolerate extremely adverse natural and artificial conditions.

3702. The ecological potentiality of an organism is determined by its ....

3703. Certain radiations like..............waves are essential for the normal functioning of the bisophere.

3704. Ultra-violet is a........ .....type of radiation.

3705. X-ray and gamma-rays are examples of.........type of radiation.

3706. The process by which the ionizing radiations break the macromolecules of the cells is called...............

3707. The biological effect of non-ionizing radiation is..............by the cellular component which absorbs them.

3708. The cellular components do not mediate the..............radiations.

3709. Much of solar ultra-violet radiations are absorbed by the containing zone of the stratosphere.

3710. UV is absorbed by photosynthetic pigments, proteins and........ of living organisms.

3711. An enzyme called as......................is involved in the process of photo activation.

3712. Atmospheric pollutants like halogens, hydrocarbons and jet propellants damage the protective..................shield. This is injurious to the life on earth.

3713. The number of..............in an atom denotes its atomic number.

3714. The combined number of protons and..............indicates the mass number of an atom.

3715. Isotopes are atoms having the same atomic number but different ....

3716. The..............particles have extremely high amounts of energy.

3717. Ionizing radiations include..............gamma rays and particles.

3718. The biological effects of non-ionizing radiations are more specific whereas those of ionizing radiations are more..............

3719. The ozone-layer of outer space screens out the..............from the sunlight.

3720. Naturally occurring radioactive elements and cosmic rays constitute what is called...............

3721. Skin disease caused by UV component of sunlight is known as ....

3722. In modern era,..............and...........are adding to the amount of background radiation.

3723. Plants require..............mainly for the formation of middle lamella of the cell walls.

3724. In animals, main role of calcium is...............

True-False Type

Write T if the statement is true, F if it is false.

3725. Some chemicals like nitrogen, hydrogen and oxygen are normal growth nutrients for various organisms.

3726. Chemicals like mercury, lead and arsenic are toxic to man and the ecoystems.

3727. Toxic photoproducts are not formed in the cell when it is exposed to UV light.

3728. Macro-molecules of the cells are physically broken by ionizing radiations.

3729. The biological effects of non-ionizing radiations are more specific.

3730. Water can not absorb UV radiations.

3731. Biological chemicals are inactivated by UV absorption.

3732. Cells do not have mechanism to repair damaged DNA to normal forms.

3733. In absence of carotenoids, plants will be killed by the UV radiations of sun.

3734. Incidence of cancer and harmful mutations to man and other organisms will increase if the amount of UV from sun falling on earth is increased.

3735. An alpha-particle is a helium nucleus consisting of two protons and three neutrons.

3736. The beta-particle is a mere electron.

3737. The gamma rays are massless electromagnetic radiation.

3738. The stable atomic nucleus triggers off the decay of radioactive elements.

3739. The stable isotopes are radioactive.

3740. The secondary cosmic rays result from the action of the primary cosmic particles on the nucleus of an air particle.

3741. The secondary cosmic rays have higher energy content than those of primary cosmic rays.

3742. The ionizing radiations are now used to sterilize and preserve food stuffs.

3743. The radiations destroy the quality of food also alongwith the organisms.

3744. Iodine-131 can cause several diseases in man.

3745. Strontium-90 may cause bone cancer as it can replace calcium.

Multiple Choice Type

Tick (√) mark the correct answer in each of the following cases.

3746. Cells are able to neutralize the damaging effect of UV radiation with the help of longer wavelengths by a process called as

a. photophosphorylation.
b. photoreactivation.
c. photooxidation.
d. photolysis.

3747. The skin of certain persons get a disease when exposed to UV radiations of sunlight. The disease is called as

a. albinism.
b. leucoderma.
c. xeroderma pigmentosum.
d. infective dermatitis.

3748. Plant cells are protected from the UV radiations of the sun due to the presence of

a. chlorophyll.
b. xanthophyll.
e. carotenoids.
d. leucoplasts.

3749. Each primary cosmic ray particle is usually a

a. electron.
b. neutron.
c. helium nucleus.
d. hydrogen nucleus.

3750. We should wear glass spectacles while working with UV rays because

   a. ultraviolet rays can penetrate the glass.
   b. UV rays can not pass through glass.
   c. the glass reduces the amount of heat entering the eyes.
   d. the glass will protect eyes from physical injury.

Short Answer Type

3751. Name the two main natural sources of ionizing radiations.

3752. Name the two man made sources of ionizing radiations.

3753. List three common forms of ionizing radiations from radioactive elements.

3754. List atleast three man made radio-isotopes.

3755. Write the names of atleast four products of nuclear fission.

3756. Name the types of cosmic rays.

3757. Write the names of atleast three effects on the organism when it is exposed to ionizing radiation.

Essay Type

3758. Describe various chemicals that are harmful to living organisms.

3759. What are the sources of ultraviolet radiations ? Describe the effects of UV radiations in absence of stratosphere.

3760. What are the various natural and artificial sources of ionizing radiation and their harmful effects ?

3761. Describe the chemical hazards associated with the nuclear fallout. Suggest the methods of protection against them.

3762. What are radiations ? How are they harmful to mankind ?

KEY AND OUTLINE ANSWERS

CHAPTER 1

Microscopic Structure of Mammalian Tissues

Item No.	*Answer*	*Item No.*	*Answer*
0101.	dendrites	0116.	d
0102.	axoplasm	0117.	b
0103.	endosteum	0118.	c
0104.	chondiocytes	0119.	b
0105.	osteocytes	0120.	a
0106.	bone	0121.	c
0107.	F	0122.	b
0108.	F	0123.	c
0109.	T	0124.	A—e
0110.	F		B—c
0111.	T		C—d
0112.	F		D—f
0113.	T		E—a
0114.	F		F—b
0115.	d	0125.	d

0126. d

0127. d

0128. d

0129. Periosteum

0130. Lymphopoiesis

0131. Neurilemma

0132. Scales

0133.

Steriocilia	*Cilia*
(i) Long tapering to a point	Fine small uniform proto plasmic projections
(ii) Non-motile, no basal granule	motile, basal granule present

0134.

Villi	*Microvilli*
(i) Location in small intestine only	Any other region as well
(ii) Multicellular, consists of number of cells having microvilli	Cell organalles, A part of villus

0135.

Stratified epithelium	*Pseudostratified* eipthelium
(i) Many layered cells of same size	One layer of cells but nuclei at different levels.
(ii) Only lower layer of cells are in contact with basement membrane	The cells are incontact with the basement membranes.

0136.

Yellow fibres	*White fibres*
(i) Elastin	Collagen
(ii) long branched	In wary bundles and branched

0137.

Haemopoiesis	*Lymohopoiesis*
(i) Formation of blood cells	Formation of lymph cells
(ii) In long bones	In lymph nodules

0138.

Cartilage	*Bone*
(i) Chondriocytes	Osteocytes
(ii) No deposition of Ca-salts, flexible	Deposition of Ca-salts, hardest tissue

0139.

Osteocytes	*Chondriocytes*
(i) Present in bone	Present in cartilage
(ii) Responsible for bone formation and repair	For cartilage formation

0140.

Node	*Node of Ranvier*
(i) Present in the stem of plants	Present in medulated nerve fibre in animals
(ii) Leaves arise from each node	The mylon sheath is discontinuous at each node

0141.

Sweat glands	*Sebaceous glands*
(i) Secrete sweat	Secrete sebum (oil)
(ii) Open directly to the outside	Open indirectly-pour their secretion in the hair follicle

0142.

Eosinophil	*Basophil*
(i) Nucleus bilobed	Nucleus multilobed, often S shaped
(ii) Stainable with acidic dyes	Stainable with basic dyes

0143. During haeomopoiesis in the bone marrow the young erythrocytes are found nucleated; later it undergoes two major changes (a) increase in the amount of haemoglobin in cytoplasm (b) decrease in the cell size with the loss of the nucleus, so that the erythrocytes circulating in the human blood are enucleated.

OR

In the bone marrow when young—nucleated ; matured before entering the blood circulation ; the red blood corpuscles are enucleated.

0144. organ—skin
tissue—blood

0145. Pages 9, 10-13 of the text...7-9 types of connective tissue cells including blood cells chondriocytes & osteocytes as well along with their functions to be discussed.

0146. Different functions of the skin with special reference to elimination of wastes, information of vitamin D etc. to be discussed.

0147. Cutaneous respiration in frog and other animals to be discussed.

0148. Epidermal and dermal derivatives in different animals to be mentioned.

0149. Oxygen carrier, transportation of wastes, CO_2, hormone, food, thermo-regulation, excretion etc. to be discussed.

0150. Fig 1.8 of the text, diagrams C and D, to be drawn and explained.

0151. All four functions—Pages 17-18 of text to be discussed.

0152. Draw diagram as fig. 1.12 and fig. 1.13 of text with coloured pencils and write brief account of epidermis and dermis.

0153. i) Draw diagrams for A and B
ii) Slide A-Human blood
R.B.C. Non-nucleated
Mention different types of W.B.C.s
Slide B-Hyaline cartilage
1) No bone marrow
2) No haversian system H Canals
3) No osteoblasts and periosteum or endosteum
4) Matrix homogenous
5) Chondroblasts in lacunae to be discussed

0154. i) procedure in practical to be noted
ii) diagrams as seen under high power of microscope of epithelial tissues, muscles
iii) characteristics of the two tissues to be mentioned

0155 a—B; b—A; c—B; d—A; e—A; f—C; g—D; h—A

0156. a—A, C. E and J; b—A, D and H; c—A, B, G and I; a—A, F and J

0157.	c	0159.	c
0158.	c	0160	d

CHAPTER 2

Digestive System

Item No.	*Answer*	*Item No.*	*Answer*
0201.	serosa	0216.	parotid, submaxillary
0202.	muscularis externa	0217.	tongue
0203.	connective	0218.	pharyngeal
0204.	muscle	0219.	open
0205.	liver	0220.	vagus
0206.	peritoneum	0221.	F
0207.	carnivorous	0222.	T
0208.	mucous or goblet	0223.	T
0209.	lamina propria	0224.	F
0210.	lacteals	0225.	F
0211.	paneth and goblet	0226.	T
0212.	oesophagus	0227.	F
0213.	Epiglottis	0228.	T
0214.	nerves	0229.	F
0215.	acidic	0230.	F

0231.	a
0232.	c
0233.	c
0234.	c
0235.	c
0236.	c
0237.	a
0238.	d
0239.	a
0240.	c
0241.	b
0242.	a
0243.	b
0244.	c
0245.	c
0246.	d
0247.	b
0248.	b
0249.	b
0250.	b
0251.	a
0252.	A—d B—c C—b D—a
0253.	A—c B—a C—e D—d

0253. Secretion of mucus by the mucous cells prevents digestion.

0254. Inadequate secretion of mucus and injury of mucosa.

0255. Page 28; para 6

0256. (i) high water contents in stool and frequent deflection.
(ii) bacterial irritation

0257. Page 21; last para and Page 22; first para

0258. Page 25; para 4

0259. Page 29; last para (contd. to page 30)

0260. Page 28; para 4 (absorption)

0261. Protein digestion in stomach and duodenum, enzymes, pH, and related glands to be discussed.

0262. Carbohydrate digestion in the mouth through the intestine; enzymes, pH and related glandular activity to be discussed.

0263. Page 29; para 3

0264. Page 30; para 1

0265. Page 31; fig 2.15

0266. Page 32; fig 2.17

0267. Page 30; fig 2.14

0268. Page 19; fig 2.1

0269. Vomiting

0270. Ulcer

0271. Catabolism

0272. Anabolism

0273. Glycogenesis

0274. Glyconogenesis

CHAPTER 3

Respiratory System

Item No.	*Answer*	*Item No.*	*Answer*
0301.	respiration	0317.	F
0302.	inspiration, expiration	0318.	T
0303.	ventilation	0319.	b
0304.	epiglottis	0320.	b
0305.	cartilaginousrings	0321.	b
0306.	dust particles, microbes	0322.	a
0307.	nonciliated	0323.	b
0308.	tidal volume	0324.	c
0309.	carbon monoxide	0325.	b
0310.	BCG vaccine	0326.	c
0311.	nervous system, blood vessels	0327	a
0312.	F	0328.	c
0313.	F	0329.	c
0314.	F	0330.	d
0315.	T	0331.	b
0316.	F	0332.	d

0333. c

0334. c

0335. Because the accumulation of mucous might occlude the tubules.

0336. Page 36 under the heading 'The lungs'.

0337. Page 37 under the heading 'Histology of the lungs'.

0338. Bronchi
Bronchioles
Terminal bronchioles
Respiratory bronchioles
Alveolar ducts
Alveolar capillaries
Tissue capillaries
Cell

0339. Some air which remains in the lungs after the maximum forced exhalation is known as residual volume.

0340. The greatest amount of air that can be expired after a maximal inspiratory effort is measured as an index of pulmonary functions. This is called as the vital capacity.

0341. Page 38; para 1

0342. The rate of respiration will increase.

0343. Carboxyhaemoglobin.

0344. 1) Haemocyanin 2) Haemerythrin

0345. Bacillus calamitte guarine

0346. Page 40; last para

0347. Page 35; last para and Page 36; para 1

0348. Page 36; para 1 and diagrammatic respresentation on page 39.

0349. Page 37 under the heading 'Inspiration & expiration'

0350. Page 37 under the heading 'Mechanism of respiration'

0351. Page 39; last para

0352. Page 37; fig 3.3.

CHAPTER 4

Circulatory System

Item No.	*Answer*	*Item No.*	*Answer*
0401.	eosinophil and basophil	0412.	c
0402.	Rhesus monkey	0413.	b
0403.	arteries	0414.	c
0404.	coronary thrombosis	0415.	A—c B—b C—a D—d
0405.	c	0416.	b
0406.	c	0417.	d
0407.	d	0418.	b
0408.	a	0419.	6000 to 10,000/cubic millimeter of blood
0409.	b	0420.	universal recipient
0410.	b	0421.	diastole
0411.	b	0422.	hypotension

0423. (i) Arteries are the vessels leading from heart, veins are the vessels which drain the blood in the heart after collecting it from different parts of body.

iii) Arteries have thicker elastic and muscular walls than the veins

(iii) The valves are present in the veins which prevents the back flow of blood. No such valves are present in the artery.

0424. People with 0-type of blood are universal donors.

(a) The type of blood that does not cause clotting to any other type since it does not have either antigen A or B and their blood can be safely transfused into any other person. The blood group is 'O' group

(b) People with AB type of blood are universal recipients As they have antigen A as well as antigen B, the blood from any person can be transfused in their body.

0425. *Closed Type*

(1) Definite vesseels are present through which blood flows.

(2) Transportation of food as well as gaseous exchange is done by closed circulatory systems.

Open Type

(1) Blood passes partly through blood vessels and partly through open spaces in the body.

(2) Open circulatory system usually performs the function of transportation of food material.

0426. *Natural*—Some persons are immune to certain diseases from birth. These people have natural or inborn immunity.

Acquired—Some persons who have once suffer from a disease, their body retains adequate levels of antibodies as a protection against future infection. This is called acquired immunity.

0427. *Allergy*—When antigen-antibody reaction occurs within the tissue instead of in the blood, causing local inflammation, dialation of arterioles, together with the increased release of histamine from mast cell. Dust particles, pollen grains and many other substancas function as antigens in an allergic reaction.

Anaphylactic shock—This is a general allergic reaction involving all the tissues of the body and occur in a matter of minutes after the infection of an antigen. All the peripheral blood vessels dialate and the capillaries become highly permeable, so that large amounts of fluid leak out from the blood into the tissues. The blood pressure decreases drastically often resulting in the death of the individual within a short time.

0428. *Pulse rate* —The beating of the heart is also felt in the arteries as regular jerks and it can be felt whenever the arteries lie near the surface as on the wrist or neck.

Blood Pressure—The flow of blood in arteries exerts a pressure on their elastic walls. This is called as blood pressure. This pressure is greater during the systole than during diastole.

0429. Page 44; para 2

0430. Page 45; para 2

0431. Page 47; last para, Page 51; last para, Page 52; para I, Page 47; para I

0432. Page 59; para 3

0433. Page 55; para I

0434. Page 52; para 2

0435. Page 46 and 47

0436. Page 41; para 2 to page 44; para 2

0437. Page 48; fig 4.6

0438. Page 49; fig. 4.7 A

0439. Page 44; fig. 4.2

0440. Statement 3 and 4.

CHAPTER 5

Excretory System

Item No.	*Answer*	*Item No.*	*Answer*
0501.	nephridia	0517.	ammonia, carbon dioxid
0502.	malpighian tubules	0518.	urea
0503.	kidney	0519.	liver
0504.	metabolic	0520.	reptiles/birds
0505.	diffusion cells	0521.	fat bodies
0506.	cortex, medulla	0522.	malpighian tubules
0507.	ureter	0523.	filtration
0508.	nephron	0524.	T
0509.	malpighian body	0525.	T
0510.	hydrostatic	0526.	F
0511.	proximal tubule	0527.	F
0512.	antidiuretic, cortical	0528.	T
0513.	posterior pituitary, adrenal	0529.	F
0514.	alcohol	0530.	F
0515.	absent	0531.	T
0516.	ammonia	0532.	F

0533. T

0534. T

0535. F

0536. F

0537. T

0538. T

0539. F

0540. F

0541. T

0542. F

0543. d

0544. c

0545. a

0546. d

0547. b

0548. b

0549. d

0550. d

0551. a

0552. d

0553. c

0554. c

0555. b

0556. a

0557. a

0558. A—c
B—a
C—b
D—e

0559.
a. Carbon dioxide
b. Urine
c. Malpighian tubules
d. Carbon dioxide
e. Renin
f. Angiotensinogen
g. Angiotensin
h. Protein

0560.
i. Glomerular filtration
ii. Reabsorption of water, glucose, potassium phosphate, bicarbonate and sodium
iii. Secretion of urea

0561.
- i. ammonia
- ii. urea
- iii. uric acid
- iv. bile pigments
- v. salts
- vi. water
- vii. CO_2

0562. Excretion is the process by which the metabolic waste products formed as a result of anabolism and catabolism are eliminated from the body.

0563.
- i. Amoeba——————Contractile vacuole
- ii. Annelids and Molluscs——————Nephridia
- iii. Insects——————Malpighian tubule
- iv. Vertebrates——————Kidney

0564. Page 67; point (i) under the heading 'Nitrogenous water products', excertion of ammonia

0565. Page 67; para 2 under the heading, Regulation of water and salts

0566. Excretion—Removal of metabolic wastes such as ammonia, urea and uric acid directly or along with faeces and urine to the exterior. Also removal of CO_2 and salts are to be mentioned.

Egestion—Removal of undigested and unabsorbed food material through the anus.

0567. Page 62; fig. 5.1

0568. Page 63; fig. 5.3

0569. Page 65; fig. 5.5

CHAPTER 6

Nervous System

Item No.	*Answer*	*Item No.*	*Answer*
0601.	spinal cord	0617.	excitatory state
0602.	two	0618.	action potential
0603.	ventral	0619.	speeds
0604.	spinal cord	0620.	orbits
0605.	cell bodies	0621.	vitamin
0606.	nuclei	0622.	bright Light
0607.	white matter	0623.	convex
0608.	reflex actions	0624.	chemical
0609.	parasympathetic	0625.	F
0610.	nerve fibre	0626.	F
0611.	synapse	0627.	T
0612.	chemical neuro	0628.	F
0613.	recovery	0629.	F
0614.	neuromuscular	0630.	T
0615.	sclerotic	0631.	F
0616.	resting phaese	0632.	F

0633.	c
0634.	b
0635.	c
0636.	b
0637.	c
0638.	c
0639.	b
0640.	a
0641.	c
0642.	a
0643.	b
0644.	b
0645.	a
0646.	c
0647.	a
0648.	a
0649.	c
0650.	a
0651.	b
0652.	b
0653.	A—e B—f C—a D—b E—g F—h G—i H—j I—d
0654.	Page 76; para 1
0655.	Page 74; para 1 and 2
0656.	Page 76; para 2
0657.	Page 77; para 3
0658.	Page 77; para 4
0659.	Pnge 81; para 9
0660.	Page 81; para 2
0661.	Page 72; Table 6.1
0662.	Page 71; para 3
0663.	Page 76; para 1
0664.	Page 79; para 9
0665.	Page 77; para 7
0666.	Page 72; para 3
0667.	Page 79; para 2
0668.	Page 78; para 2
0669.	Page 81; para 3
0670.	Page 71; fig. 6.1
0671.	Page 78; fig 6.8A.
0672.	Page 80
0673.	Page 16; fig. 6.11

CHAPTER 7

Muscular System

Item No.	*Answer*	*Item No.*	*Answer*
0701.	non striated or smooth	0719.	glyeogen
0702.	striated	0720.	tension
0703.	smooth	0721.	load
0704.	voluntary	0722.	repetitive
0705.	cylindrical	0723.	fatigue
0706.	myofibrils	0724.	fatigue
0707.	sarcomeres	0725.	sarcoplasmic reticulum
0708.	anisotropic	0726.	cholinergic
0709.	contraction	0727.	T
0710.	sarcomere	0728.	F
0711.	intercalated	0729.	F
0712.	peristaltic	0730.	T
0713.	thick	0731.	F
0714.	cross bridges	0732.	F
0715.	calcium	0733.	F
0716.	ATP	0734.	F
0717.	ATP	0735.	F
0718.	creatine phosphate	0736.	F

0737.	F
0738.	F
0739.	T
0740.	F
0741.	b
0742.	b
0743.	c
0744.	a
0745.	a
0746.	a
0747.	a
0748.	a
0749.	d
0750.	c
0751.	b
0752.	b
0753.	A—d B—a C—b D—c E—f F—e G—g
0754.	Page 85; para 4
0755.	Page 84; para 1
0756.	Page 88; para 1
0757.	Page 89; para 1
0758.	Page 89; para 5
0759.	Page 90; para 2
0760.	Page 90; para 2
0761.	Page 83; para 2
0762.	Page 86; para 1
0763.	Page 86; para 2, Page 88; para 1, Page 84; para 1
0764.	Page 86; fig. 7.7
0765.	Page 89; para 1
0766.	Page 90; para 2 & 3
0767.	Page 84; fig. 7.1 A
0768.	Page 84; fig. 7.1 B
0769.	Page 84; fig. 7.3
0770.	Page 85; fig. 7.5
0771.	Page 86; fig. 7.7
0772.	Page 89; fig. 7.11
0773.	Page 89; fig. 7.10

CHAPTER 8

Skeletal System

Item No.	*Answer*	*Item No.*	*Answer*
0801.	skeletal system	0815.	(i) ilium (ii) pubis
0802.	(i) axial (ii) appendicular	0816.	(i) heart (ii) lungs
0803.	(i) skull (ii) vertebral column	0817.	carpals
0804.	(i) girdles (ii) limb bones	0818.	metacarpals, phalanges
0805.	osteoblasts and osteocytes	0819.	tibia, fibula
0806.	bone marrow	0820.	axial
0807.	salts	0821.	F
0808.	frontal, parietal	0822.	T
0809.	orbits	0823.	F
0810.	(i) cervical (ii) lumber	0824.	F
0811.	floating ribs	0825.	F
0812.	glenoid cavity	0826.	T
0813.	acetabulum	0827.	F
0814.	(i) clavicle (ii) suprascapula	0828.	T

0829. F

0830. F

0831. T

0832. T

0833. c

0834. b

0835. c

0836. d

0837. b

0838. c

0839. c

0840. b

0841. b

0842. A—e
B—a
C—d
D—b
E—c
F—f
G—g

Short Answer Type

0843. Cranium

0844. Pectoral and pelvic girdle respectively.

0845. Cervical, thoracic, lumber, sacral and caudal.

0846. The last two pairs of ribs forming the sides of the chest cavity.

0847. Page 93 under the heading 'Bones of the chest or Thorax', last three lines.

0848. Wrist and ankle

0849. Page 95; Ball and Socket joint

0850. Page 93 (The skull) para 1

0851. Page 95; last para

0852. Long bone, Femur, Humerus and the like

0853. Page 91; para 2

0854. The Femur

Essay Type

0855. Page 91; para 1

0856. Pages 91 and 93 'The girdles' and Page 94 'Bones of the hand and the leg'.

0857. Advantages of system in posture, protection etc. also see page 91.

0858. Page 93, The skull and 'The vertebral column and bones of the chest.

0859. Explain the structure with the help of a diagram of a vertebra alongwith short description—page 93.

0860. Page 95, See different types of joints.

0861. Page 95, Hinge joint and pivot joint

0862. Page 95, Ball and socket joint and pivot joint.

0863. Page 95; last two paras

0864. Page 94; fig. 8.4.

0865. Page 94; fig. 8.5.

CHAPTER 9

Endocrine System

Item No.	*Answer*	*Item No.*	*Answer*
0901.	steroid, testosterone	0916.	F
0902.	pineal, adrenal	0917.	F
0903.	pituitary, hypothalamus	0918.	T
0904.	calcitonin, calcium	0919.	F
0905.	iodine, thyroxin	0920.	T
0906.	blood	0921.	F
0907.	melanocyte stimulating harmone, or melanophore	0922.	b
0908.	sugar, glycogen	0923.	c
0909.	female sex hormones or estrogen and progesterone	0924.	d
0910.	growth and reproduction	0925.	c
0911.	T	0926.	b
0912.	F	0927.	a
0913.	F	0928.	b
0914.	T	0929.	a
0915.	F	0930.	c

0931. d

0932. a

0933. A—a
B—c
C—b
D—e
E—d

0934. Definition of a hormone including the site of their secretions (Page 97; para 1)

0935. Refer page 97, [Points (i) to (iii) in the 1st para]

0936. Chemical nature of various harmones like Proteinaceous, steroid, polypeptides, and amines on page 97; para 1 and 2.

0937. Hypoactivity or underactivity of thyroid gland causes Cretinism (in children), Myxedema (in adult). Malfunctioning of gland results in simple goitre mainly due to deficiency of iodine which affects the synthesis of thyroxin (Page 98-99)

0938. Maintained by the proper balance of parathyroid hormone (PTH) page 99.

0939. Page 98; para 1.

0940. Page 100; para 1.

0941. Definition of ductless glands with special emphasis of their secretory and transport mechanism (page 97).

0942. It is now established that Pituitary gland cannot be regarded as master gland since its activities are under the control of releasing and inhibiting factors situated in the hypothalamus and at the same time is influenced by the target organs (also see pages 99 and 102).

0943. 1. Growth hormone—size of the skeleton and organs
2. Prolactin—secretion of milk
3. ACTH—governs the secretion of adrenal cortex hormones.
4. TSH—controls the secretion of thyroxin
5 Gonadotropins—control the gonadal activities (FSH and LH)

0944. Hormones secreted by the adrenal cortex.

0945. Chemical coordinators are hormones. In controlling and coordinating the various activities the role played by any hormone can be explained showing the integration of nervous and endocrine system.

0946. Pages 99 and 102.

0947. Here the various hormonal disorders associated with the over and under activities of each gland may be taken up.

0948. a. Hypothalamus
b. Oxytocin
c. Antidiureitc hormone
d. Vasopressin
e Kidney
f. LH
g. FSH
h. ACTH
i. Mammary glands
j. Thyroid glands
k. Parathyroid glands
l. Growth hormone

CHAPTER 10

Reproductive System

Item No.	*Answer*	*Item No.*	*Answer*
1001.	testes, ovaries	1017.	a
1002.	infundibulum	1018.	b
1003·	uterus	1019.	c
1004.	epididymis	1020.	b
1905.	urethra	1021.	c
1006.	penis	1022.	b
1007.	seminiferous tubules	1023.	c
1008.	spermatocytes, spermatides	1024.	a
1009.	fertilization	1025.	c
1010.	zygote	1026.	a
1011.	artificial insemination	1027.	b
1012.	test tube babie	1028.	d
1013.	myometrium, endometrium	1029.	d
1014.	28, 3 to 5 days	1030.	c
1015.	intra uterine devices	1031.	Mesovarium
1016.	b	1032.	Ovary

1033. Females

1034. Estrogen

1035. mammals (any of the higher vertebrates from reptiles to mammals)

1036. Sperms

1037. Vas deferns

1038. Oogenesis

1039. Internal fertilization

1040. Mesovarium

1041. Mesorchium

1042. Precocious puberty

1043. Tubectomy

1044. Menopause

1045. Vasectomy

1046. Zygote

1047. Implantation

1048. Proliferation

1049. onset of menstruation at an age earlier than normal or 13 years of age.

1050. The main blood vessels from placenta enter the foetus through thick cord called the umbelical cord.

1051. a. The fusion of egg and sperm
   b. The release of ovum from mature graafian follicle is called as ovulation
   c. The artificial deposition of sperms in the vagina of female is called as artificial insemination
   d. Menstruation is a process in which blood, mucus and uterine tissues are eliminated.
   e. The structure through which the foetus derives its nourishment and oxygen.
   f. The attachment of fertilized ovum to the wall of the uterus.

1052. 15 years, 13 years

1053. a Menstruation is a process in which blood, mucus and uterine tissues are eliminated ; menstrual cycle continues. And menopause is the cessation of menstural cycle.
   b. Sperm is produced by testis, ovum is produced by ovary. The structure of both may also be drawn
   c. Tubectomy is operative procedure in females, vasectomy is operative procedure in males

d. Internal fertilization — Inside the body of females. External fertilization is fertilization out side the body.

e. Umbelical cord is the main blood vessel from placenta entering the foetus through thick cord. Placenta is the structure through which the foetus derives its nourishment and oxygen.

1054. Page 108; fig 10.3

1055. Page 109; para on *Artificial insemination*

1056. Page 111; para on *Fertility control*

1057. Page 110; para 8 (point 6)

1058. Page 109; para on *Ovarian cycle.*

CHAPTER 11

Biological Rhythms

Item No.	*Answer*	*Item No.*	*Answer*
1101.	circadian rhythms	1114.	c
1102.	endogenous rhythms	1115.	d
1103.	seasons	1116.	A—c, B – d, C—a
1104.	diurnal rhythms	1117.	man
1105.	nocturnal	1118.	Cockroach
1106.	F	1119.	Houseflir
1107.	T	1120.	Beas
1108.	T	1121.	Noctural
1109.	F	1122.	Diurnal
1110.	F	1123.	Body
1111.	d	1124.	Cirannual
1112.	b	1125.	Day
1113.	c	1126.	Page 112; para I

1127. Salmon, Teal, Stork, Starling, Eels.

1128. *Exogenous rhythms*	*Endogenous rhythms*
i. imposed by rhythmical changes of environment.	i. Not effected by the environment.

ii. controlled by the environment.	ii. controlled from within the body i.e., innate.
iii. variations in the blood do not effect exogenous rhythms.	iii. Effected due to the variations in the levels of hormones, glucose and lymphocytes in the blood.

1129. The period for which the light is subjected to an organism.

1130. Fishes—by altering the photoperiod — the breeding season is enhanced thus inducing repeated breeding instead of once in nature. Useful for increasing edible fishes.

1131. Page 113 ; last para of the text—discuss the following points : inheritance of rhythms, some developed after birth and some at maturity etc. to be discussed.

1132. Man is a continuous as well as seasonal breeder regarding menstrual cycle in women to be discussed.

1133. cirannual rhythms — a part of biological rhythms – exhibited due to environmental changes for details refer page 112.

1134. (i) Biological rhythm like Biological clock is related to time based rhythmic activity.
(ii) Both having periodicity of events.

1135. c

CHAPTER 12

Meristems

Item No.	*Answer*	*Item No.*	*Answer*
1201.	Schmidt	1212.	a
1202.	Clows	1213.	b
1203.	shoot apical meristem	1214.	a
1204.	root apical meristem	1215.	b
1205.	epidermis	1216.	a. Low DNA content. b. Low rate of cell division c. Low rate of protein synthesis.
1206.	quiescent centre	1217.	Shoot apex
1207.	apical	1218.	Tunica
1208.	meristem	1219.	Corpus
1209.	lateral	1220.	Due to anticlinal cell division
1210.	corpus	1221.	Dome shaped
1211.	c	1222.	Bases of the inter node

1223. Meristems are groups of cells which divide, grow and prepetuate (characteristics as given on page 117).

1224. Page 117

1225. Apical, lateral and intercalary (details as discussed on page 119).

1226. Description of reproductive apex as described on page 120.

1227. See root apex page 121.

1228.

Shoot apex	*Root apex*
a. truly apical	subterminal
b. no root cap	root cap present
c. presence of lateral appendages (leaf primordia)	no lateral appendages

1229. Description as given on page 122.

1230.

Vegetative apex	*Reproductive opex*
a. summit remains inactive	Summit becomes active
b. flanks gives rise to leaves	sepals and petals and summit gives rise to stamens and carpels.

1231. Page 119

1232. Page 119

1233. Page 121

1234. Activity of procambium as discussed on page 120

1235. Page 120; fig. 12.3

1236. Page 122; fig 12.7

1237. Page 122; fig 12.5

1238. Page 122; fig 12.6

1239. Page 118; fig 12.1

CHAPTER 13

Water Relations of the Plant Cell

Item No.	*Answer*
1301.	zero
1302.	osmotic
1303.	wall pressure
1304.	out of
1305.	increases
1306.	T
1307.	T
1308.	F
1309.	T
1310.	T
1311.	T

Item No.	*Answer*
1312.	F
1313.	b
1314.	b
1315.	c
1316.	b
1317.	b
1318.	c
1319.	a
1320.	a
1321.	b

1322. Temperature, pressure and concentration of the solutions

1323. a. Exosmosis
  b. Endosmosis
  c. No flow to either side

1324. If it is deplasmolysed.

1325. No, the movement is from higher concentration to the lower concentration in terms of the solvent molecules.

1326. Page 126, D.P.D. is directly responsible for the intake of water.

1327. No, it is from the higher to the lower water potential.

1328. Page 126; para 7
Page 127; para 1

1329. The following points to be noted:
1. The process of Osmosis
2. The cell has a semipermeable membrane
3. The cells have different concentrations of the sap
4. The flow of water occurs from the cell with lower concentration to that with higher concentration in terms of the concentration of sap

1330. Direction of movement is from B to A

1331. Direction of movement is from C to D

CHAPTER 14

Root Structure and Function

Item No.	*Answer*
1401.	absorption
1402.	epidermis
1403.	epidermis
1404.	passage
1405.	cortex
1406.	xylem and phloem
1407.	metaxylem
1408.	exarch
1409.	protoxylem
1410.	polyarch
1411.	absorption
1412.	Metabolic
1413	secondary

Item No.	*Answer*
1414.	cork and phelloderm
1415.	F
1416.	T
1417.	T
1418.	T
1419.	T
1420.	F
1421.	F
1422.	T
1423.	a
1424.	b
1425.	b
1426.	b
1427.	A—e B—i C—g D—h E—d F—c G—b H—a I—f

1428. Secondary xylem and phloem

1429. Phelloderm

1430. Water translocation

1431. Absorption of water will not take place and the plant will die.

1432. dicot root—tap root system
monocot—fibrous root system

1433. The last layer of the cortex.

1434. The lignin and suberin thickening on the radial walls of the endodermal cells.

1435. Thin walled cells present in the endodermis are called passage cells.

1436. Below the endodermis.

1437. a. production of lateral roots.
b. protection of vascular tissue.

1438. Root hairs.

1439. Absorption of water without the consumption of metabolic energy.

1440. Absorption of water with the utilization of metabolic energy.

1441. Pericycle

1442. Endodermis

1443. Radially

1444. Page 128.

1445. Endodermis is the last layer of the cortex. It has cells with casparian strip and thin walled passage cells. It controls the movement of materials in the root.

1446. Page 129.

1447. Tabular column on page 130.

1448. Pages 130-131.

1449. Page 131.

1450. Page 132.

1451. Page 133; last para

1452. Page 132; fig. 14.8 D and E

1453. Page 131; fig. 14.7

1454. Page 131; fig. 14.6

1455. Page 130; fig. 14.5

1456. Page 129; fig. 14.2

1457. Page 130; fig. 14.4

CHAPTER 15

The Inorganic Nutrition of Plants

Item No.	*Answer*
1501.	air
1502.	carbon dioxide
1503.	trace
1504.	Calcium
1505.	Mature
1506.	decreases
1507.	Zinc
1508.	Boron
1509.	Copper
1510.	Molybdenum
1511.	F
1512.	F
1513.	F
1514.	T
1515.	T

Item No.	*Answer*
1516.	T
1517.	F
1518.	T
1519.	F
1520.	T
1521.	T
1522.	a
1523.	b
1524.	a
1525.	a
1526.	a
1527.	a
1528.	d
1529.	a
1530.	a
1531.	A—b B—d C—g D—e E—c F—f

1532. ATP, NAD, NADP

1533. Chlorosis

1534. In the older leaves.

1535. Yes

1536. Boron

1537. Exanthema

1538. Page 134

1539. Page 134

1540. Page 136

1541. Page 134

1542. Points along which the answer is expected :

a. Definition of macronutrients.

b. list of the elements

c. major symptoms caused by the deficiency of each of these major elements

(on the basis of the text or class discussion).

1543. Points along which the answer is expected.

a. Definition of micronuterients

b. list of micronutrients

c. major symptoms caused by deficiency of each of these trace elements

(on the basis of text or class discussion).

CHAPTER 16

The Stem

Item No.	*Answer*
1601.	epidermis
1602.	primary
1603.	thickened
1604.	cuticle
1605.	cortex
1606.	storage
1607.	multipicative
1608.	phelloderm
1609.	monocot
1610.	ring
1611.	F
1612.	T
1613.	T
1614.	F
1615.	T
1616.	T
1617.	F

Item No.	*Answer*
1618.	F
1619.	F
1620.	T
1621.	a
1622.	d
1623.	b
1624.	c
1625.	a
1626.	d
1627.	c
1628.	b
1629.	a
1630.	e
1631.	c
1632.	a
1633.	a
1634.	d

1635. A—d
B—f
C—h
D—g
E—i
F—e
G—c
H—b
I—a

1636. Closed vascular bundle

1637. Anticlinal

1638. Dead

1639. Conductive

1640. Epidermis

1641. Root

1642. Cork cambium (Phellogen)

1643. Complex cells of common origin

1644. Sclerenchyma, tracheids, vessels, fibre, sclereids

1645. Protection and gaseous exchange

1646. Fibres and sclereids

1647. In a ring

1648. Secondary xylem and secondary phloem

1649. Between vascular bundles

1650. Permitting the entry of air into the internal tissue

1651. Pericycle

1652. On the radius

1653. Open vascular bundle consists of cambium
Closed vascular bundle consists of no cambium

1654. Periderm

1655. Due to degeneration of protoxylem

1656. Vascular cambium and and cork cambium

1657. The procambium after differentiation into primary xylem and phloem transforms itself into vascular cambium which lies between xylem and phloem

1658. Below the epidermis

1659. Phloem, cambium, xylem, cambium and phloem

1660. In stem vascular differentiation is in relation to leaves while in root it is independent of lateral organ.

1661. Page 142

1662. Page 145 ; para I

1663. Page 145

1664. Page 143

1665. Page 147 ; Tabular column

1666. Page 147 ; Tabular column

1667. Page 149

1668. Increase in diameter of the plant body — vascular cambium and cork cambium.

1669. Page 149; last para.

1670. Page 143 ; Table 16.1

1671. Page 143 ; Table 16.1

1672. Page 143 ; fig 16.1 **B** and **C**

1673. Page 144 ; fig 16.3

1674. Page 146 ; fig 16.5

1675. Page 149 ; fig 16.8

1676. Page 148 ; fig 16.6 **D**

CHAPTER 17

Forms and Functions of the Conducting Tissues

Item No.	*Answer*	*Item No.*	*Answer*
1701.	xylem, vascular system	1719.	F
1702.	complex	1720.	F
1703.	tracheids and vessels	1721.	T
1704.	Simple	1722.	F
1705.	pitted	1723.	T
1706.	pay	1724.	F
1707.	late wood	1725.	T
1708.	organic solutes	1726.	F
1709.	phloem	1727.	F
1710.	sieve plate	1728.	b
1711.	primary	1729.	a
1712.	lignified	1730.	a
1713.	cambium	1731.	c
1714	Tracheary elements	1732.	c
1715.	transpiration	1733.	a
1716.	osmotic	1734.	c
1717.	F	1735.	a
1718.	T	1736.	b

1737. A—g
B—f
C—e
D—d
E—a
F—c

1738. A—c
B—e
C—a
D—b
E—d
F—f

1739. Functional xylem

1740. Cambium

1741. Complex tissue

1742. Secondary phloem

1743. a. Tracheary elements
b. Parenchyma
c. Fibres

1744. Tracheids and vessels

1745. The ends of tracheid cells do not have perforation plate whereas the vessels have these plates

1746. Annular and helical

1747. In exarch, the metaxylem towards centre and in endarch it is away from the centre

1748. Fibre tracheids and libriform fibres

1749. Early wood and late wood

1750. Vital theory, Transpiration pull theory

1751. Conduction of organic nutrients from "Source" to "Sink"

1752. Page 159

1753. Sieve cells and sieve tube members

1754. Source — Site of synthesis of food

1755. Page 161

1756. Any root or stem modifications

1757. No

1758. Page 152

1759. Page 152 and 153

1760. Page 158 and 159

1761. Pages 157—159

1762. Page 155

1763. Page 155 and 156

1764. Page 160 and 161

1765. Page 152 ; fig. 17.1

1766. Page 153 ; fig 17.3

1767. Page 157 ; fig 17.10

1768. Page 161 ; fig 17.12

CHAPTER 18

Leaf Structure and Functions

Item No.	*Answer*	*Item No.*	*Answer*
1801.	Blackman	1819.	d
1802.	Calvin	1820.	a
1803.	PEP	1821.	d
1804.	grana	1822.	a
1805.	light	1823.	c
1806.	light	1824	a
1807.	water	1825.	d
1808.	dark	1826.	a
1809.	potometer	1827.	b
1810.	Cobalt chloride	1828.	c
1811.	inversely	1829.	b
1812.	hydathodes	1830.	a
1813.	T	1831.	b
1814.	T	1832.	c
1815.	F	1833.	b
1816.	F	1834.	b
1817.	F	1835.	a
1818.	T	1836.	c

1837. b 1839. Blackman

1838.
- a. Temperature
- b. light
- c. Carbon dioxide
- d. water

1840. Example of C_3 plants — sunflower and many plants other than those included in the families Amarnthaceae, Chenopodiaceae, Chenopodiaceae, Portulaceae, Euphorbiaceae, Nyctaginaceae, Cyperaceae and Gramineae.

Example of C_4 plants—Maize, Boerhaavia, grass and other members of the families mentioned above.

1841. a. Phenyl mercuric acetate (PMA).

b. Abscisic acid (ABA) or silicon emulsion.

1842. Presence of chlorenchymatous bundle sheath.

1843. Any three out of the following four points.

C_3 Plants	*C_4 plants*
a. No Kranz anatomy	Kranz anatomy present
b. Show Calvin cycle	Both Calvin cycle and Hatch and Slack cycle present
c. PEP carboxylase is absent or not absent in mesophyll cells.	PEP carboxylase abundant in mesophyll cells
d. CO_2 first fixed in RUDP	CO_2 first fixed in PEP

1844. RUDP and PEP, respectively.

1845. Kranz anatomy.

1846. Robin Hill.

1847. Any two of the following :
- a. Ferric salt
- b. Quinone
- c Indophenol dye

1848. NADP

1849. Any two of the following :

a. $NADPH_2$
b. O_2
c. ATP

1850. Oxygen is liberated in splitting of water molecules.

1851. Page 179 ; Theory Sayre and Scarth.

1852. Levitt (1967) explanation on page 179.

1853. The effect of the following factors on the rate of photosynthesis as described on pages 175-177.

1. Light
2. Carbon dioxide
3. Temperature
4. Water

1854. a. Mesophyll differentiated into palisade and spongy parenchyma.

b. Undifferentiated mesophyll (only spongy type present)

c. Palisade parenchyma is present on both the sides of the spongy parenchyma.

1855. Description of structure of chloroplast pages 160-170 and page 170 ; fig 18.5

1856. Description of

a. Photosystem I
b. Photosystem II, Page 172

1857. Description of Calvin cycle, Page 174

1858. Page 174

1859. C_4 photosynthesis page 174, Page 175 fig. 18.10.

1860.
i. Electron transfer (trapping of light energy)
ii. Phosphorylation
iii. Formation of $NADPH_2$
iv. Evolution of O_2
v. Reduction of CO_2 to form simple sugars

1861. By the use of radioactive isotopes of O^{-18} (description as given in the text).

1862. a. Structure of hydathode on page 182 ; fig. 18.15
b. Function —guttation on page 182

1863. Those plants in which carbon dixide fixation and reduction follows the Calvin cycle are called C_3 plants. Those where CO_2 fixation and reduction follows Hatch-Slack pathway are called C_4 plants. (Details as given in the text).

1864. Describe the significance of transpiration.

1865. Origin and development of leaf on page 164.

1866. Description of mesophytic dicot leaf as given in the text.

1867. Explanation of diffusion of gases through the general surface of the plant body and the environment.

1868. a. The normal source of hydrogen needed for carbon dioxide reduction is water. In this process water splits to form hydrogen and dydroxyl ions. The H_2 reduces NADP to $NADPH_2$ which is used in CO_2 reduction ann hydroxyl ions gives rise to water and oxygen. Thus there is the liberation of oxygen which maintains the balance of oxygen cycle of the environment. If this process is skipped by the supply of reducing agent there will not be any libration of O_2. Thus the balance of the environment will be disturbed.
b. There will be a rapid consumption of CO_2 as such and again the environment will be disturbed.

1869. If all the plants of the world will be removed, the production of food will cease since plants are the primary producer, consequently the whole food chain will be disturbed.

1870. Repeated applications of antitranspirants will cause reduction in the rate of transpiration which in turn will affect the turgidity of cells, movement of water and minerals and ripening of the fruits.

1871. a. Stomatal closure will be affected.
b. Enzymes will be inactivated. This will affect the rate of photosynthesis.

1872. a. Blackman's principle of limiting factor should be explained as given on page 175.

b. Graph to be drawn and intrepretation provided on the basis of the text.

1873. Page 165 ; fig. 18.1

1874. Page 167 ; fig. 18.3

1875. Page 168 ; fig 18.4

1876. Page 166 ; fig. 18.2

1877. Page 170 ; fig. 18.5

1878. Page 182 ; fig. 18.15

1879. Page 181 ; fig. 18.14

CHAPTER 19

Respiration

Item No.	*Answer*
1901.	succinate
1902.	succinate
1903.	anaerobic respiration
1904.	phosphoglycerate
1905.	enolase
1906.	pyruvate
1907.	3-phosphoglycerate, ATP
1908.	T
1909.	T
1910.	F
1911.	T
1912.	T
1913.	F
1914.	a
1915.	b
1916.	c
1917.	c
1918.	c
1919.	d
1920.	c
1921.	c
1922.	a
1923.	a
1924.	b
1925.	a
1926.	c
1927.	c

1928. Decarboxylation

1929. Page 183

1930. Carbohydrates, fat, proteins

1931. i. 3 phosphoglyceraldehyde
ii. Dihydroxyacetonephosphate

1932. Dihydroxyacetone is converted into 3 phosphoglyceraldehyde by the enzyme triosephosphateisomerase and is utilized in respiration

1933. Page 185

1934.

Aaearobic respiration	*Aerobic respiration*
1. Occurs in the absence of oxygen	1. Occurs in presence of oxygen
2. Relsase of 2ATP	2. Release of 36 ATP
3. Occurs in cytoplasm	3. Occurs in mitochondria
4. Pyruvic acid is the end product	4. Oxaloacetic acid is the end product

1935. Page 189 and 190

1936. Aconitase

1937. Page 189 and 190

1938. a. Cyanide
b. Carbon monoxide
c. Malonate

1939. Mitochondrion

1940. NADP

1941. Page 188

1942. Page 188

1943. Carbohydrates

1944. Pages 183–185

1945. Page 184

1946. Page 185

1947. Page 189

1948. Page 187

1949. Page 189

1950. Page 189

1951. Page 183

1952. Page 189 and 190

1953. Page 189 and 190

1954. Page 190 ; para 2

1955. Page 190 ; para 3

1956. Page 190 ; parae 5 and 6

1957. Page 19—191

1958. Page 188

1959. Page 185

1960. Page 185

CHAPTER 20

Plant Growth and Development

Item No.	*Answer*	*Item No.*	*Answer*
2001.	irreversible	2018.	F
2002.	division, elongation, differentiation	2019.	T
2003.	senescence	2020.	F
2004.	division	2021.	F
2005.	Sigmoid	2022.	F
2006.	mitotic	2023.	T
2007.	elongation	2024.	F
2008.	Phytochrome	2025.	T
2009.	F	2026.	d
2010.	F	2027.	b
2011.	T	2028.	b
2012.	T	2029.	a
2013.	F	2030.	c
2014.	T	2031.	b
2015.	T	2032.	b
2016.	F	2033.	c
2017.	F	2034.	b

2035. c

2036. b

2037. A—d
B—e
C—b
D—c
E—a

2038. c

2039. d

2040. d

2041. Dwarf maize

2042. Chlorophyll

2043. Gibberellin

2044. Kinetin

2045. Kinetin

2046. Abscisic acid

2047. Page 199; fig. 209

2048. Phytochrome

2049. S shaped or Sigmoid

2050. Page 194 or the names by the teacher

2051. light and temperature

2052. Page 196; last Para

2053. Page 193 (environmental variables), Page 196; Ist Para

2054. Page 195 ; para 2, page 196 ; fig 20.4

2055. Page 193 ; paras 1, 2, and 3

2056. Page 195; para 2

CHAPTER 20

Plant Growth and Development

Item No.	*Answer*	*Item No.*	*Answer*
2001.	irreversible	2018.	F
2002.	division, elongation, differentiation	2019.	T
2003.	senescence	2020.	F
2004.	division	2021.	F
2005.	Sigmoid	2022.	F
2006.	mitotic	2023.	T
2007.	elongation	2024.	F
2008.	Phytochrome	2025.	T
2009.	F	2026.	d
2010.	F	2027.	b
2011.	T	2028.	b
2012.	T	2029.	a
2013.	F	2030.	c
2014.	T	2031.	b
2015.	T	2032.	b
2016.	F	2033.	c
2017.	F	2034.	b

2035. c

2036. b

2037. A—d
B—e
C—b
D—c
E—a

2038. c

2039. d

2040. d

2041. Dwarf maize

2042. Chlorophyll

2043. Gibberellin

2044. Kinetin

2045. Kinetin

2046. Abscisic acid

2047. Page 199; fig. 209

2048. Phytochrome

2049. S shaped or Sigmoid

2050. Page 194 or the names by the teacher

2051. light and temperature

2052. Page 196; last Para

2053. Page 193 (environmental variables), Page 196; Ist Para

2054. Page 195 ; para 2, page 196 ; fig 20.4

2055. Page 193 ; paras 1, 2, and 3

2056. Page 195; para 2

CHAPTER 21

Plant Movements

Item No.	*Answer*	*Item No.*	*Answer*
2101.	growth or tugor or hydration	2112.	F
2102.	hydration	2113.	c
2103.	Nutation	2114.	d
2104.	diageotropism	2115.	c
2105.	leaf	2116.	b
2106.	leaf	2117.	a
2107.	T	2118.	Turgor movement
2108.	F	2119.	Turgor movement
2109.	T	2120.	Geotropism
2110.	F	2121.	Page 202; para 2
2111.	T		

2122. a. bending towards light, bending towards gravity, movement of the growing points, and others as suggested by the teacher.

b. stomatal movement, movement in *Mimosa pudica*, rolling or folding of grass leaves and others as suggested by the teacher.

c. movement of zoosposes or gametes, movement of *Chlamydomonas* and *Volvox*.

2123. On the basis of the information given in the text and as taught in the class.

2124. Page 203

2125. Page 204; para 2

2126. Page 202; para 3

CHAPTER 22

Plant Rhythms

Item No.	*Answer*	*Item No.*	*Answer*
2201.	Circadian	2210.	T
2202.	Annual	2211.	F
2203.	Lunar	2212.	F
2204.	Endogenous	2213.	F
2205.	biological	2214.	b
2206.	cells	2215.	c
2207.	T	2216.	b
2208.	F	2217.	c
2209.	T	2218.	a

2219. Any of the following :

Sleep movement of leaves, opening and closing of flowers, flower initiation, leaf fall in deciduous trees, release of spores and gametes in algae, and others as given in the text or by the teacher.

2220. 1. about 28 days
2. about 24 hours
3. about a year
4. about 12 8 hours

2221. 1. The daily light periodicity.

2. The direction of cytoplasmic streaming.

3. The phases of moon.

4. The temperature and day length cycles.

5. The temperature and day length cycles.

2222 Exogenous rhythms : Rate of CO_2 uptake in photosynthesis, rate of water uptake throughout the day, stomatal movement and others as suggested by the teacher.

Endogenous rhythms : Sleep movement of leaves in plants, release of gametes in certain algae, fragrance in the flowers of night queen, annual production of flowers in many trees, annual leaf fall in many trees.

2223. As many examples as possible of the rhythms with different periodicities, e g., circadian, lunar, tidal and annual are desired as given in the text.

2224. Two diagrams are expected to be drawn giving the necessary descriptions, first a diagram showing the different position of a point on the wheel as it moves and, second a graph depicting the position of the point on the wheel on the pattern of the text.

2225. The answer should highlight the persistence of the endogenous rhythm even in the unfavourable conditions which do not provide the normal cycles of day length, temperature etc. in contrast to the exogenous rhythm which do not operate when the external factor is withdrawn. The text may also be referred.

2226. Answer showing the understanding of the biological clock in line with the text page 207 is expected.

CHAPTER 23

Systematics as a Discipline

Item No.	*Answer*	*Item No.*	*Answer*
2301.	Carolus Linnaeus	2307.	F
2302.	classification	2308.	F
2303.	*Homo sapiens*	2309.	T
2304.	Charles Darwin	2310.	c
2305.	T	2311.	d
2306.	T	2312.	a

2313. Systematics may be defined as the discipline which deals with with the kinds and diversity of all organisms and the existing relationships among themselves.

2314. Carolus Linnaeus

2315. Charles Darwin was born in 1809. He made extensive study on the classification and propounded the theory of organic evolution. He also explained the origin and evolution of species through natural selection.

2316. In order to modify some of the ideas of classical systematics, and to incorporate the results of recent studies in systematics of living organisms '*New Systematics*' was proposed

2317. Important contributions of Carolus Linnaeus are

(a) He introduced the binomial system of nomenclature.

(b) He was the first to propose a scientific system of classification of plants.

2318. Classification is a system of arrangement of organisms into groups showing relationships.

2319. Taxonomy is the study of all plants and animals, their identification and classification.

2320. Nomenclature is the process of giving scientific names to plants and animals.

2321. Sir Julian Huxley (1940)

2322. Pages 211-212 under the heading 'Origin and development of systematics'.

CHAPTER 24

Utility of Systematics

Item No.	*Answer*	*Item No.*	*Answer*
2401.	health	2409.	F
2402.	observational	2410.	b
2403.	correct identification	2411.	b
2404.	Applied biology	2412.	c
2405.	F	2413.	Pages 214 and 215
2406.	T	2414.	Page 214; para 4
2407.	T	2415.	Page 214; para 2
2408.	T	2416.	Page 214; para 2
		2417.	Page 215

CHAPTER 25

Principles of Classical and New Systematics

Item No.	*Answer*
2501.	Bentham and Hooker
2502.	Julian Huxley
2503.	Engler and Prantl
2504.	statistical methods
2505.	F
2506.	T
2507.	F
2508.	T
2509.	T

Item No.	*Answer*
2510.	T
2511.	F
2512.	c
2513.	c
2514.	d
2515.	d
2516.	A—d B—c C—b
2517.	A—b B—d C—e D—a

2518. a. Era of Classical systematics from earliest to Linnaeus.
b. Era of New systematics past Linnaeus period.

2519. Page 216; para 2.

2520. Prior to Charles Darwin it was beleived that life was static and classification was based upon the idea of constancy of species.

Charles Darwin established that life is not static but it is changing. The concept that species are never static formed the basis of systematics.

2521. Page 216; para 6

2522. Page 216; para 5

2523. Page 217; para 3 and 4

2524. Page 217; para 5

2525. Page 217; para 4

2526. Pages 216 and 217

2527. Pages 216 and 217

CHAPTER 26

Binomial Nomenclature

Item No.	*Answer*	*Item No.*	*Answer*
2601.	species	2609.	T
2602.	latin	2610.	F
2603.	Carolus Linnaeus	2611.	T
2604.	Brunfels	2612.	F
2605.	*Homo sapiens*	2613.	T
2606.	*Brassica campestris*	2614.	b
2607.	italic	2615.	a
2608.	F	2616.	b
2617.	Carolus Linnaeus		

2618. Nomenclature is the naming of plants and animals around us.

2619. Scientific nomenclature is giving the scientific names to plants and animals.

2620. Page 220

2621. Page 220

2622. Page 220

2623. Page 220

2624. Scientific names are useful because (i) they avoid multiplicity of names (ii) they are the same for the people of all languages throughout the world.

2625. Pages 219 and 220

2626. for first part refer page 219

Botanical names of 5 common plants

Pea	*Pisum sativum*
Wheat	*Triticum vulgare*
Mango	*Mangifera indica*
Mustard	*Brassica campestris*
Lotus	*Nymphaea lotus*

Zoological names of 5 common animals

Man	*Homo sapiens*
House-fly	*Musca domestica*
lion	*Panthera leo*
Pigeon	*Columba livia*
Frog	*Rana tigrina*

CHAPTER 27

Familiarity with Taxa

Item No.	*Answer*
2701.	taxon
2702.	phylum
2703.	species
2704.	*Panthera leo*
2705.	*Panthera tigris*
2706.	*Solanum tuberosum*
2707.	genus
2708.	family
2709.	Order
2710.	class
2711.	phylum
2712.	F
2713.	T
2714.	F
2715.	T
2716.	F
2717.	T
2718.	F
2719.	T
2720.	d
2721.	d
2722.	b
2723.	b
2724.	a
2725.	b
2726.	Page 223
2727.	Page 223; para 1
2728.	Page 223; para 4

2729. Page 224; under the heading 'Species as a category'

2730. Page 224; under the heading 'Species as a category'

2731. Page 224; under the heading 'Species as a category'

2732. Page 222; para 2

2733. Page 223

2734. Page 224; under the heading 'Species as a category'

CHAPTER 28

Systems of Plant and Animal Classification

Item No.	*Answer*	*Item No.*	*Answer*
2801.	Carolus Linnaeus	2812.	c
2802.	Carolus Linnaeus	2813.	a
2803.	Adolf Engler and Karl Prantl	2814.	b
2804.	John Hutchinson	2815.	c
2805.	Darwin	2816.	b
2806.	1859	2817.	c
2807.	single	2818.	b
2808.	Aristotle	2819.	a
2809.	a	2820.	a
2810.	b	2821.	A—c B—e C—b D—a
2811.	c	2822.	A—c B—e C—b D—a

2823. a. Page 225; under the heading 'Artificial system of classification'
b. Page 226; under the heading 'Natural system of classification'
c. Page 227; under the heading 'Phylogenetic system of classification'

2824. a. Artificial system of classification
    b. Phylogenetic system of classification
    c. Improved phylogenetic system of classification
    d. Natural system of classification

2825. Carolus Linnaeus in 1753

2826. a. Plants with covered seeds
    b. Plants with naked seeds
    c. Animals with vertebral column
    d. Animals without vertebral column

2827. Page 228

2828. Page 227; para 3

2829. Charles Darwin in 1859

2830. Aristotle

2831. Page 230; para 4

2832. Page 230; para 5

2833. (i) Dicotyledonae (ii) Monocotyledonae

2834. Page 225-226

2835. Page 226, under the heading 'Natural Systems of classification'

2836. Page 227; para 1

2837. Page 227-229

2838. Page 227 ; para 2

2839. Page 227-229

2840. Page 230; under the heading 'Systems of Animal classification'

2841. Page 226-230

2842. Page 225-226

2843. Page 227

2844. Page 230

2845. Page 230

2846. Page 230

CHAPTER 29

Outline Classification of Plant and Animal Kingdoms

Item No.	*Answer*	*Item No.*	*Answer*
2901.	Leguminosae	2918.	6
2902.	tetradynamous	2919.	Urochordata
2903.	Solanaceae	2920.	Osteichthyes
2904.	Head or Capitulum	2921.	F
2905.	apocarpous	2922.	T
2906.	Cruciferae	2923.	T
2907.	caryopsis	2924.	T
2908.	trimerous	2925.	T
2909.	petals	2926.	T
2910.	sepals	2927.	F
2911.	stamens	2928.	F
2912.	siliqua	2929.	T
2913.	marginal	2930.	F
2914.	diadelphous	2931.	F
2915.	notochord	2932.	T
2916.	Agnatha and Gnathostomata	2933.	T
2917.	Chondrichthyes	2934.	F

2935. T

2936. F

2937. T

2938. T

2939. T

2940. F

2941. T

2942. T

2943. F

2944. F

2945. T

2946. F

2947. F

2948. F

2949. T

2950. T

2951. b

2952. a

2953. c

2954. d

2955. b

2956. c

2957. d

2958. a

2959. d

2960. c

2961. a

2962. d

2963. d

2964. d

2965. d

2966. c

2967. b

2968. a

2969. c

2970. a

2971. A—b
B—c
C—e
D—a
E –f

2972. A—e
B—a
C—b
D—f
E—c

2973.
A—d
B—f
C—a
D—g
E—e
F—c

2974.
A—c
B—e
C—a
D—b
E—d
F—g
G—i

2975.
A—e
B—f
C—b
D—d
E—a

2976.
A—d
B—e
C—f
D—a
E—b

2977.
A—c
B—d
C—b
D—b

2978.
A—g
B—f
C—a
D—b
E—e

2979. Page 234; under the heading 'Floral Characteristics'

2980. Page 235; under the heading 'Floral diagram'

2981. $\oplus\ \text{⚥}\ K_{(5)}\ \overparen{C_{(5)}\ A_{(5)}}\ G_{(\underline{2})}$

2982. Cruciferae

2983.
$$\oplus\ \text{⚥}\ \begin{array}{cccc} K_{4-5} & C_{4-5} & A_{(10)} & \underline{G_{1}} \\ \text{or} & \text{or} & \text{or} & \\ (4\text{-}5) & (4\text{-}5) & (9)+1 & \end{array}$$

2984. Magnoliaceae

2985. Compositae

2986. Refer fig. 29.16 F, fig. 29.6, fig 29.5

2987. Page 238; under the heading 'Economic importance'

2988. Refer families Solanaceae and Gramineae

2989. a. *Allium cepa*
b. *Raphanus sativus*
c. *Triticum vulgare*
d. *Annona squamosa*
e. *Nocturnnm sativum*

2990. a. Legume
b. Siliqua
c. Cypsela

2991. a. Protozoa
b. Arthropoda
c. Echinodermata

2992. a. Amphibia
b. Aves
c. Mammalia

2993. a. *Bombyx mori*
b. *Palamnaeus*
c. *Camelus*

2994. *Nymphaea lotus*

2995. Peacock

2996. Page 232-234 under the heading 'Description of plant'

2997. Page 245; para 2

2998. Describe family Gramineae since it is considered most economically important, Page 236-237.

2999. Describe any family from Page 236-245

29100. Cruciferae — siliqua or silicula
Solanaceae — Berry or capsule
Compositae — Cypsella
Gramineae — Caryopsis
Leguminosae — Legume or Lomentum
Ranunculaceae — Aggregate of follicles or berries.

29101. a. Page 245
b. Page 243
c. Page 241

29102. a. Page 238
b. Page 239

29103.	Pages 243 and 244
29104.	Describe the features of phylum Arthropoda Page 250 and 251
29105.	Pages 252 and 253
29106.	Pages 252-253
29107.	Page 256-257
29108.	Page 252
29109.	Page 253
29110.	Page 253
29111.	Page 252 and pages 253 to 256
29102.	a. Fig. 29.17 H b. Fig. 29.19 A c. Fig. 29.23 A
29113.	Page 250
29114.	Fig. 29.12 B-E
29115.	Fig. 29.7 C

CHAPTER 30

Collection and Identification of Animals and Plants

Item No.	*Answer*	*Item No.*	*Answer*
3001.	catalogued and stored	3009.	F
3002.	relaxed	3010.	F
3003.	chloroform	3011.	T
3004.	5% formalin	3012	T
3005.	chloroform	3013.	T
3006.	4% formalin and 6% formalin to be injected in larger specimens	3014.	a
3007.	traps	3015.	b
3008.	floras of the world	3016.	note book and pencil

3017. (i) methol
(ii) magnesium sulphate
(iii) chloral hydrate.

3018. in crop fields

3019. 95% alcohol

3020. (i) shell
(ii) mouth aperture
(iii) eyes and tentacles

3021. kitchens, store, latrines

3022. fresh waters streams, lakes, ponds, rivers

3023. in search of food (algae, moss, other weeds and insects)

3024. Rivers, pond, sea

3025. Page 261; under the heading 'Osteichthyes, Chordata'

3026. fishes will die

3027. Page 261; under the heading 'Osteichtheyes, chordata'

3028. It causes irritation in eyes

3029. in or near ponds

3030. 4% formalin for small frogs and inject 6% formalin in larger specimens.

3031. Page 261—262, under the heading 'Frogs and Toads'

3032. traps, nets, shot guns

3033. 4% formalin or 75—80% alchohol

3034. Page 262; under the heading 'Rat (Mamunalia)'

3035. Pages 226—263, under the heading 'Collection and methods of preservation in plants'.

3036. a. National herbarium in Indian botanical garden Howrah.
b. Kew garden in England

3037. (i) Yoked key
(ii) Bracketed key

3038. Page 259; under the heading 'Field observations'

3039. Page 260; under the heading 'Collection and methods of preservation of animals'.

3040. Page 260; see sub heading 'Pila'.

3041. Page 260; see sub heading 'Cockroaches'.

3042. Page 261 ; para 1

3043. Page 262; under the sud heading 'Prawn'.

3044. Page 261; under the sub heading 'Fish'.

3045. Page 261; under the sub heading 'Fish'.

3046. Page 262; under the sub heading 'Pigeon'.

3047. Page 262; under the sub heading 'Pigeon'.

3048. Page 265 ; para 2 serial no. 5

3049. Page 265 ; para 2 serial no. 1.

3050. Page 265 ; para 2 serial no 7.

3051. Page 265 ; para 2 serial no. 6

3052. Page 263 ; under the sub heading 'Plant Press'.

3753. Page 262 ; under the sub heading 'Vasculum'.

3054. Page 263 ; under the heading 'Collection and methods of preservation of plants'.

3055. Page 266 ; under the sub heading 'Bracketed Key'.

3056. Page 265; under the sub heading Indented Key.

3057. Page 266 ; under the heading 'Identification of animals with the help of key'.

CHAPTER 31

Growth of Human Population

Item No.	*Answer*	*Item No.*	*Answer*
3101.	hominidae	3111.	T
3102.	50,000	3112.	d
3103.	0.4—0.5 per cent	3113.	a
3104.	sigmoidal type of growth curve	3114.	b
3105.	agriculture and Urbanisation	3115.	c
3106.	T	3116.	d
3107.	F	3117.	a
3108.	F	3118.	c
3109.	F	3119.	b
3110.	F		

3120. Physical and biological components

3121. Plants, animals and micro-organisms

3122. a. Population is the group of individuals of same species living in a well defined geographical unit (area).

b. Ecosystem is a self sustaining unit showing the interactions between biotic communities among themselves and also with the physical environment.

3123. a. Hunger
b. War
c. Epidemics

3124. Expansion of his population,
Destruction of natural environment,
Change and modification of natural ecosystems to suit his well being.

3125. Page 272

3126. Exhaust of natural resource (overuse),
Modification and destruction of environment and the imbalance between demand and supply

3127. Page 271 ; fig. 31.2

CHAPTER 32

Factors Controlling Population Distribution and Density

Item No.	*Answer*	*Item No.*	*Answer*
3201.	demographic	3217.	younger
3202.	75	3218.	persons in economically productive ages
3203.	land area	3219.	d
3204.	habitable	3220.	a
3205.	high	3221.	a
3206.	less	3222.	b
3207.	cold climate	3223.	d
3208.	agriculture	3224.	c
3209.	water	3225.	d
3210.	alluvial	3226.	d
3211.	resource based	3227.	c
3212.	redistribution	3228.	d
3213.	overcrowding	3229.	Page 274 ; para 3
3214.	natural increase	3230.	Page 275 ; para 2
3215.	Afghanistan and Angola		
3216.	India		

CHAPTER 33

Soil, Rainfall and Temperature with Reference to Natural Resources

Item No.	*Answer*	*Item No.*	*Answer*
3301.	water	3318.	T
3302.	rocks	3319.	T
3303.	Organic matter	3320.	F
3304.	organisms	3321.	d
3305.	soil	3322.	a
3306.	T	3323.	d
3307.	F	3324.	c
3308.	T	3325.	b
3309.	F	3326.	c
3310.	T	3327.	d
3311.	F	3328.	c
3312.	T	3329.	c
3313.	T	3330.	b
3314.	F	3331.	c
3315.	T	3332.	b
3316.	T	3333.	c
3317.	F		

3334. Page 281 ; para 2 and page 282 ; para 2

3335. Pages 284, 285 and 286 under the headings 'Importance of water', and 'Temperature'

3336. Page 283; para 2 under the heading 'Cause of cloud formation and rainfall'.

CHAPTER 34

Our Natural Resources—Their Use and Abuse

Item No.	*Answer*
3401.	energy
3402.	two
3403.	three
3404.	uses, physico-chemical
3405.	fossil fuel
3406.	producer
3407.	non-renewable
3408.	inorganic
3409.	inorganic
3410.	F
3411.	F
3412.	T
3413.	T
3414.	F
3415.	F
3416.	F
3417.	F

Item No.	*Answer*
3418.	F
3419.	F
3420.	T
3421.	F
3422.	F
3423.	F
3424.	F
3425.	F
3426.	F
3427.	F
3428.	T
3429.	T
3430.	F
3431.	d
3432.	c
3433.	b
3434.	b

3435. A—c
B-b
C—a

3436. A—a
B-d
C—b
D—c
E—e

3437. A—a
B-d
C—b
D—c

3438. A-c
B—b
C-a
D—d

3439. Wood pieces

3440. Inexhaustible

3441. Snake

3442. Recycling, substitutional, synthesis

3443. Pages 290 and 291

3444. Oxides of Nitrogen, Carbon and Sulphur

3445. Genetic engineering, biofertilizers

3446. Hydro power, Wind power and Nuclear power

3447. Biogas or gobar gas plant, Sun basket

3448. Algae and yeast

3449. Page 294; under the heading 'Renewable Resources'

3450. Page 293; last nara

3451. Page 293; last para

3452. Use of fossil fuels in the economic development of country

3453. Page 288; column 2, para 1

3454. Page 296; column 2, para 1

3455. Pages 296 and 297

3456. Page 297; para 1

3457. Pages 297 and 298

3458. Page 298; paras 1 and 2

3459. Page 298; para 2

3460. Page 298; para 3

3461. Page 292; para 3

33462. Pages 298 and 299

3463. Page 295; para 2

3464. Page 299; last para

3465. Show in map (Students will draw the map of India and point out the places in the map)

3466. Straight pyramid

CHAPTER 35

Conservation of Forests and Wildlife

Item No.	*Answer*	*Item No.*	*Answer*
3501.	herbivorous	3516.	F
3502.	forest	3517.	T
3503.	deer	3518.	F
3504.	carrying capacity of the ecosystem	3519.	T
3505.	tropical rain	3520	T
3506.	summer	3521.	F
3507.	wild life	3522.	F
3508.	forestation		
3509.	forest	3524.	c
3510.	monoculture	3525.	b
3511.	biological diversity	3526.	c
3512.	F	3527.	c
3513.	F	3528.	d
3514.	F	3529.	b
3515.	T	3530.	A—b B—a C—e D—d

3531. Block cutting, reforestation, pest and fire control

3532. Page 303-304, under the heading 'Forests' ; sub heading management.

3533. Page 304; column 2, para 2

3534. Page 304; under the heading 'Wildlife conservation'

3535. Page 304; under the heading 'Wildlife conservation'

3536. Page 301; para 2

3536. Page 303-304, under the sub heading 'Management'

3538. Page 303; under the sub heading 'Types'

CHAPTER 36

Environmental Pollution

Item No.	*Answer*
3601.	cotton dust
3602.	ethylene and sulphur dioxide
3603.	fluorocarbon
3604.	ozone layer
3605.	Carbon monoxide
3606.	respiratory
3607.	remaining sulphur after combustion and by precombustion, desulphurisation of fuel
3608.	low
3609.	simple, inorganic forms
3610.	pollutant
3611.	aquatic
3612.	bacteria
3613.	fishes
3614.	the non-removal of salts, biocides and dyes
3615	phosphate phosphorus, inorganic nitrogen
3616.	Zirconium

3617. lime

3618. *Colpidium, Glaucoma*

3619. trickling filter, activated sludge method

3620. aeration

3621. air, sludge

3622. break up the

3623. generate

3624. recycling

3625. pollution

3626. fertilizer, methane

3627. F

3628. T

3629. F

3630. F

3631. T

3632. F

3633. T

3634. F

3635. F

3636. c

3637. c

3638. a

3639. c

3640. d

3641. c

3642. a

3643. d

3644. d

3645. b

3646. a

3647. a

3648. c

3649. c

3650. b

3651. c

3652. a

3653. d

3654. c

3655. a

3656. a

3657 A—c
B—a
C—b
D—d
E—e

3658. Pages 307 and 308

3659. SO_2, aerosols, CO, NO, photochemical oxidants

3660. economical and effective

3661. (i) Seeds of neem, mahua for oil
    (ii) Gobargas plant for gas and fertilizer
    (iii) Coconut waste for paper board
    (iv) Jute waste for paper board

3662. Page 306; column I, para 2

3663. 1. addition of poisonous substance
    2. addition of suspended salts
    3. addition of nontoxic salts
    4. water deoxygenation
    5. heating of water

3664. Page 317; para 4, under the heading 'Effect of effluents and pollutants.'

3665. *Spherotilus natans*

3666. Page 318; under the heading 'Treatment of water'

3667. Page 319; under the heading 'Reverse osmosis'

3668. Page 315; column 2

3669. Page 312; fig 36.3

3670. Page 314; column 2, para 2

3671. Page 315; para 2

3672. Page 306; para I

3673. Page 306; column 2, para 2

3674. Page 307; para I

3675. Page 310; last para under the heading 'Nitrogen oxides'

3676. Page 310; column 2, para 2

3677. Page 311; under the heading 'Air quality standards'

3678. Page 311; under the heading 'Major pollutants and effluents'

3679. Page 318; under the heading 'Treatment of waste'

3680. Page 318; —do—

3681. Page 318; column 2, para I

3682. Page 319; column I, para I

3683. Page 319; column I, para 3

3684. Page 319; column I, para 2

3685. Page 308; column 2, from para 2

3686. Page 307; under the heading 'Air pollution'

CHAPTER 37

Radiation and Chemical Hazards

Item No.	*Answer*	*Item No.*	*Answer*
3701.	adapted	3716.	primary cosmic ray
3702.	genetic makeup	3717.	X-rays
3703.	electromagnetic	3718.	general
3704.	non-ionizing	3719.	Ultraviolet
3705.	ionizing	3720.	background radiation
3706.	ionization	3721.	Xeroderma pigmentosum
3707.	mediated	3722.	nuclear test device and bombs
3708.	ionizing	3723.	Calcium
3709.	Ozone	3724.	bone formation
3710.	nucleic acids	3725.	T
3711.	photoreactivating enzyme	3726.	T
3712.	Ozone	3727.	F
3713.	protons	3728.	T
3714.	neutrons	3729.	T
3715.	mass number	3730.	F

3731. T

3732. F

3733. T

3734. T

3735. F

3736. T

3737. T

3738. F

3739. F

3740. T

3741. F

3742. T

3743. F

3744. T

3745. T

3746. b

3747. c

3748. c

3749. c

3750. b

3751. 1. Radioactive elements of the earth's crust.
2. High energy cosmic rays of outer space.

3752. 1. X-rays 2. Radioactive wastes of atomic or nuclear reactors.

3753. 1. Alpha-particles 2. Beta-particles 3. Gamma rays

3754. 1. Uranium-238 2. Radium-226 3. Potassium-40

3755. 1. Iodine-131 2. Strontium-90 3. Barium-142 4. Crypton-91

3756. 1. Primary cosmic rays 2. Secondary cosmic rays

3757. 1. Genetic changes 2. Cancer 3. Shortening of the life span

3758. Page 322; paras 1, 2 and 3

3759. Page 323; column 1, under the heading 'Ultraviolet radiations'

3760. Page 323; column 2, under the heading 'Ionizing radiations' up to page 324; column 2

3761. Pages 324, 325 under the heading 'Chemical hazards associated with the nuclear fallout.

3762. Page 323-324.